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GAS IN ENGLAND.—At Worcester, the directors have announced a reduction in the price of gas, from 5*s.* to 4*s.* 6*d.* per thousand cubic feet.

The permanent barracks at Aldershott have just been lighted with gas. The London *Builder* states that the works have been erected by the Government, at a cost of £22,000. The gas supplied is said to be pure and good, and its introduction is regarded with much satisfaction by all ranks and branches of the service.

We learn from the London *Artizan* that at York, the gas company, between whom and the public and corporation there has been so much dissatisfaction on account of the high prices charged, have agreed to reduce their price for public lamps, from 4*s.* 9*d.* to 3*s.* 9*d.* per thousand cubic feet, the price to include all other charges. To private consumers the charge is to be: present year, 3*s.* 9*d.*; and from and after January, 1864, 3*s.* 6*d.* per thousand cubic feet, instead of 4*s.* 6*d.* as heretofore.

GAS IN SCOTLAND.—Gas has just been introduced in the cars of the Scottish Central Railway. The first train lighted in this manner left Edinburgh for Perth, on the evening of December 8th. The whole train of cars was brilliantly lighted by means of pipes with expanding couplings carried from roof to roof, communicating with the reservoir placed in a specially constructed compartment of the guard's break-van. Throughout the journey the lights remained steady and clear, and the passengers were much gartified with the successful introduction of this vastly superior method of illumination. Should the present trial be satisfactory, it is expected that the system will be extended to the other night trains on the line, and probably introduced on the neighboring railways.—*London Artizan.*

[Gas has been used in railway trains in this country for several years.—ED.]

GAS IN FRANCE.—Several landlords in Paris have recently assumed the right to prohibit their tenants from using gas, not only in the upper part of houses, but in the shops on the ground floor. The Court of Cessation has recently decided that the custom of lighting by gas having become almost universal, every landlord must be taken to have consented to its use in the absence of any express stipulation to the contrary.

It is computed that the public lighting of Paris will cost, for the year 1863, 247,600 francs more than in 1862.

At the end of 1861, there were 22,986 burners in the public streets. This number was increased 1,319 burners in 1862. It is supposed that during this year 1,200 more burners will be necessary.

L' Echo du Havre says that in that city the place Napoleon III. has been lighted in such a manner that "nothing more can be desired by the most determined somnambulist." Two reflectors to each lamp are provided—a glass surrounding the flame, and one metallic shade reflector—white enamelled within and bronze without. The advantage resulting from this reflector consists in the fact that the loss of a quantity of rays of light is avoided. *L'Echo* says: "we hope that soon our boulevards and principal streets will be called upon to enjoy the advantages of this system of lighting."

The town of Thonon is about to be lighted with gas. The municipal administration have accorded the concession to M. Eugene Deligny, who will light 120 public burners at a cost of 4,000 francs. The total cost of these works will be 92,800 francs ($18,560).

PHOTOMETER APPARATUS FOR SALE.—A complete photometer apparatus, with a movable room, connections, joints, &c., complete. Apply at the room of the AMERICAN GAS-LIGHT JOURNAL, No. 39 Nassau Street, corner of Liberty Street.

GAS-LIGHT.—ITS VALUE AND ANTIQUITY.

A recent writer appositely remarks, that in the present era, when the creative faculty of man seems to be more than ever busy in its obedience to the primitive injunction to subdue the earth, it seems but to be consistent with the harmony and order of the world that the production of light should have been one of the earliest aims of British industry. For the daily experience of social as well as organic life, declares light to be one of the chief necessaries of man, no less than of every other living thing; and sense and science alike at once accept as truth, that light was the first material force that worked in the embryo universe.

From the tallow dips of the last generation, powerless and void of everything save smell, to the bright stearic acid that cheers the drawing room now-a-days, what a development! In the iron arteries under towns, in the constellation of burners that rule the nights of favored days, rising over the chaotic lamps of old, what a creation! And can any one doubt that the same voice which first bade light to be, has summoned gas to the service of man, and pronounced the light from it to be good?

The discovery and earliest observation of elastic aëriform fluids capable of being inflamed, and imparting light and heat, must, according to Hughes, undoubtedly have been of great antiquity. The most ancient writings contain notices of inflammable vapors springing from fissures and cavities in the earth. It is evident, therefore, that gas being a natural production, no such individual as the discoverer and inventor of gas ever existed. Modern chemistry will have no difficulty in showing that all inflammable gases, whether arising naturally from rocks, or produced artificially by combustion or otherwise, are composed of simple elements, which present a remarkable analogy to the common bihydride of carbon, the gas chiefly consumed in our street lamps and houses at the present day.

Inflammable gases may be truly said to be as old as the first creation of organic matter, for wherever animal or vegetal substances have existed, by the immutable laws of nature, they have been subject to eremacausis, and wherever decomposition has taken place, a variety of gases has been produced, some of them combustible and others not. Whether the change be that engendered by the slow combustion of decay, or that more speedy process caused by the application of sensible heat, the effect is the same—the gases are equally producod in the two cases.

Gas may, in one sense, be called a more natural production than steam, although the latter has existed from the first creation of water, and in its palpable state, as proceeding from boiling water, must have been observed in all ages.

The *discoveries* of man in respect to gas and steam, ought rather to be called *applications;* they are conquests over the elements, the subjugation of great powers in nature to his use and convenience. So it is with nearly all great inventions, in which is found one power of nature after another, chained, confined, bound down, stored, and then let loose when required, and made to work machines, to propel ships across the ocean, to supply the place of human exertion itself in a thousand different ways; nay, to pass far beyond the actual powers of the combined labor of multitudes, and to effect that by a single effort which the manual strength of a world could scarcely accomplish.

If such astonishing applications of steam and gas had been made in the days of ancient Greece, what magnificent, expressive, and high-sounding names would have been found to convey their meaning! Instead of such contemptible little monosyllables as *gas* and *steam*, one might have heard of the spirit of coal, and the spirit of water, with some superlative adjective to stamp the vast importance of each. In such an age these wonderful conquests would have thrown all meaner efforts into the shade; for them alone would poetry have strung its harp, and the grandest epic productions of genius would have commemorated the victory of man over the inanimate matter of nature, instead of dedicating her loftiest songs to the art of war.

As already stated, jets of flaming gases, bursting out from the ground, have attracted notice from a very early date, so that savage tribes, owing to the grandeur of the spectacle, apparently unsupported by fuel, considered the spot whence such emanated as the abodes of their gods. The well-known fires of Baku still burn, and are due to the ignition of light carbide of hydrogen with some naphtha vapor. They are worshipped by the savages in the neighborhood of the Caspian Sea. In China the borers for salt water often meet with streams of combustible gases, which they employ for illuminating factories and evaporating brines; consequently, the Chinese were acquainted with the use of coal-gas long before the knowledge of its application was acquired by Europeans. The most familiar instance of the elimination of inflammable gases from the earth in England, is the fire-damp of the miners; but it is not of such a good quality as that artificially produced.

Some of the earlier nations considered fire as a type of divinity, and one can scarcely wonder at the feelings of veneration occasioned by mysterious outbursts of flame, the origin of which appeared utterly incomprehensible. Hence superstition erected her alters over such flames, and claimed the influence of the gods to sustain the perpetual miracle. But all that had been observed with reference to inflammable vapors in olden times, was very far indeed from leading to any attempt to collect and use them. Their very nature and composition were unknown, and the most mistaken ideas prevailed as to their real elements. It was not until modern chemistry had exploded volumes of ancient dogmas, had traced the so-called elements to far simpler forms, and had taught the laws according to which simple bodies are combined in order to constitute all forms of matter—it was not till then that it began to be seen that the inflammable vapor of coal, wood, oils, and other fatty substances, was analagous with the marsh gas which arises from the decomposition of vegetals under water; that it was of the same nature as the *ignis fatuus* or *Will-o'-the-wisp*, which on the wild moor or bog has lighted many a traveller to destruction; finally, that it was nearly the same as the gas which arises from the decomposition of water, however effected; and that, in fact, one of the constituents of water, the greatest antagonist and extinguisher of flame, was itself the most inflammable substance in nature, namely, hydrogen gas; while oxygen, the other element, is the greatest supporter of combustion.—*Muspratt.*

HISTORY OF WATER-GAS.

(*Continued from page* 214.)

Dr. Fyfe has still more recently experimented upon the hydrocarbon process for making gas in connection with Boghead coal. He found that

produced:	Boghead Coal alone, average of 6 trials.	Boghead Coal with water, average of 8 trials.
Cubic feet of gas per ton	16,093	39,553
Specific gravity of gas	650	575
Amount condensed by chlorine	22.3	10.89
Illuminating power of 1 cubic foot, in Argand burner of 58 holes, consuming about 4 ft. per hour, expressed in sperm candles, consuming 120 grains per hour	11.79	4.73
1 cubic foot of the gas — grains of sperm	1414.5	568.5
Gas from 1 ton of coal was — to — lbs. of sperm	3253.5	3213.5

The value of Boghead gas alone is 34 per cent. higher, according to these experiments, than in those of Dr. Frankland, while the total quantity of light per ton of coal expressed in lbs. of sperm from the gas of the hydrocarbon process, differs but little in the two statements, as is shown below:

	From Boghead Coal alone, lbs. of sperm — gas from 1 ton of coal.	From Boghead Coal with water-gas, lbs. of sperm — gas from 1 ton of coal.
According to Frankland	2887.7	3546.5
According to Fyfe	3213.5	3213.54

Mr. Clegg obtained 52,000 cubic feet of gas from a ton of Boghead coal, by the hydrocarbon process, each foot of which gave a light equal to four candles; the total value of the gas in lbs. of sperm was consequently 3515.7. The great difference in the results of the two first-quoted experimenters lies in the different quantities of gas obtained from the Boghead coal alone, differences in the total quantity of gas in the water process being due to the greater or lesser supply of water-gas furnished, the total illuminating power of the gases, whatever their quantity, remaining pretty nearly the same.

Dr. Fyfe accounts for this great difference in the produce from Boghead coal alone, by the low heat at which Dr. Frankland experimented, and quotes an instance in favor of more intense heat, in which he employed a very high temperature, and obtained both a larger produce of gas, and a gas of superior illuminating power; a ton of coal yielding 17,680 cubic feet of gas, equal to 12.12 candles per foot; or 3673 lbs. of sperm per ton of coal—a quantity greater even than was obtained by Frankland by the hydrocarbon process.

Dr. Fyfe, from the foregoing results, considers that by employing the water process "*there is no increase in light from the gas of a ton of coal compared with that obtained in those instances in which the carbonizing of the coal alone is properly conducted.*"

His next inquiry was directed to the question, whether there may not be a gain by obtaining a much larger quantity of gas, though it be of inferior illuminating power.

With this object, smaller quantities of coal were operated upon in the same apparatus, and a large quantity of water-gas introduced at a high temperature into the coal retort.

An average of 5 trials gave:

Cubic feet of gas per ton of coal	52,042
Specific gravity of gas	462
Condensed by chlorine per cent	5.8
Illuminating power per foot in Argand burner, consuming about 8 feet per hour, in sperm candles of 120 grains per hour's consumption	1.99
1 cubic foot of gas — grains of sperm	238.56
Gas per ton of coal — grains of sperm	1773.6

Judging from these experiments there is a very great loss of total illuminating power by the use of water-gas, amounting on the average to 46 per cent.; while Dr. Frankland, assuming a low value for the gas from Boghead coal alone, calculated the gain in illuminating power by water-gas at 48 per cent.

In another experiment in which Dr. Fyfe obtained 75,253 cubic feet of gas from a ton of coal with water-gas, the gas obtained was only equal in illuminating value to 348.3 lbs. of sperm. The gas obtained in this experiment was only equal to 0.27 candles per cubic foot, while Mr. Clegg obtained 75,000 cubic feet in the same manner, of the value of 2.4 candles per cubic foot.

Thus, the most discordant results are obtained by different experimenters, and the process must be considered as very uncertain. Dr. Fyfe distinctly announces the conclusion he arrived at from his trials, in the following terms: "*In no instance is there any gain in the amount of light from Boghead coal-gas by the agency of water, in the method recommended by the advocates of the hydrocarbon-gas;*" and whenever the quantity of gas is increased to any great extent, there is a very decided loss of illuminating power.

In estimating the economy of the hydrocarbon process, and considering the total quantity of light obtainable from a ton of coal as the standard of comparison, Dr. Fyfe arrived at the following results, taking his own experiments as to the quantity and quality of the gases generated, and Mr. Clegg's estimate of the cost of manufacturing the coal, water, and hydrocarbon-gases, as correct. Mr. Clegg being a staunch advocate of the hydrocarbon process, has probably not over-estimated the cost of production; indeed, in the case of water-gas alone, many incline to think that five pence per 1,000 cubic feet, the cost assumed, is far too low.

Boghead coal, yielding 16,093 cubic feet of gas, and costing 28s. per ton, and the manufacturing expenses, according to Clegg, being 143.775 pence per ton.

16,093 cubic feet of coal-gas, yielding light equal to 3253.5 lbs. of sperm, will cost 479.775 pence.

39,553 cubic feet of hydrocarbon-gas, yielding light equal to 3213.5 lbs. of sperm, will cost 597.075 pence.

Or, 1000 cubic ft. of coal-gas, cost 29.804 pence.
1000 " " hydrocarbon-gas 15.09 "

Then,

lbs. of sperm per ton of coal.		lbs. of sperm per ton of hydrocarbon.		Cost of coal-gas per ton.		Comparative cost of coal-gas.
3253.5	:	3213.5	=	479.77	:	473.87
and 597	:	473.87	=	100	to	79.3

or a saving in favor of Boghead coal-gas alone = 20.7 per cent.

When more gas is obtained from the same quantity of coal by the still greater addition of water-gas, the comparative economy of the two processes is observed to be still less favorable to the water scheme. Then, as before,

				Pence.
1 ton of coal yielding	16,093	cubic feet at a total cost of		479.775
Water-gas	35,950	" " " "		179.732
		or 5d. per 1000 cubic feet.		
Hydrocarbon-gas	52,042	cubic feet at a total cost of		659.527
		or 12.672 pence per 1000 feet.		

1 foot of the gas being equal to 1.99 candles, or 1773.6 lbs. of sperm per ton of coal, we obtain:

Coal-gas — lbs. sperm per ton.		Coal and water-gas — lbs. sperm per ton.		Cost of coal-gas.		Comparative value of coal and water.
3253.5	:	1773.6	=	479.77	:	261.5 and
659	:	261.5	=	100	:	39.6

showing a saving in favor of Boghead gas alone of 60.4 per cent.

It has been further shown by Dr. Fyfe that in many of the published statements which have been put forward in favor of this mode of gas-manufacture, the advantages arising from the quantity of gas alone have been taken into calculation, without reference to its inferior quality, and that in every case where a fair quantity of gas has been obtained from the coal alone by proper management, not only is there no economy in converting it into hydrocarbon-gas, but a considerable loss, and this without taking enlarged gas-holders, pipes, &c., into account, which would be required to obtain an equal amount of light from the less luminous gas.

The foregoing trials having been made in small apparatus, Dr. Fyfe has since experimented on a manufacturing scale at Leith Gas-works, where, although the results did not perfectly correspond with those previously obtained, the general conclusions were confirmed. He obtained 27,700 cubic feet by the hydrocarbon process from a ton of coal, which was equal to 2830.15 lbs. of sperm. Dr. Frankland, without reference to the economic value of White's process, the details of which he leaves in the hands of gas-engineers, maintains that in the comparisons instituted by Dr. Fyfe, the quantity of gas obtained from Boghead coal alone is very much over-estimated, and hence the great discrepancy in their conclusions regarding the merits of the process. In corroboration of this view he cites a former estimate of the quantity of gas yielded by a ton of Boghead coal by Dr. Fyfe, and others by eminent gas-engineers who worked upon a manufacturing scale, with some others by himself, in which a diaphragm retort was employed. The following table shows these different results:

ESTIMATES OF THE VALUE OF BOGHEAD CANNEL.

AUTHORITY.	Cubic feet of gas per ton.	Gas from 1 ton — lbs. of sperm.
Mr. Wright	11,000	2182.1 lbs.
Mr. Barlow	13,344	2657.0 "
Mr. King	13,549	1993.6 "
Dr. Fyfe	14,800	2283.2 "
Advertisement of proprietors of Boghead Cannel	13,500	1967.1 "
Dr Frankland, 1st experiment	13,240	2387.7 "
Dr. Frankland, 2d experiment	14,560	2441.1 "
Dr. Fyfe, with 7 lb. charges	16,093	3253.5 "

Comparing these results, including the lower estimate of Dr. Fyfe for the Boghead gas alone, with the gas from the hydrocarbon process, examined by the Bunsen photometer, in three several trials, Dr. Frankland shows the following amounts of gain by that process, according as one or other of the authorities for the Boghead gas alone be selected.

Percentage Gain in Illuminating Power by the Hydrocarbon Process as applied to Boghead Cannel.

Name of Experimenter on Hydrocarbon Process.	Comparison with Results obtained with Boghead Cannel alone, by						
	Mr. Wright.	Mr. King.	Dr. Fyfe.	Mr. Barlow.	Proprietors of Boghead.	Dr. Frankland 1st exp't.	Dr. Frankland 2d exp't.
	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.
—							
Dr. Fyfe, experiment at Leith	29.7	42.0	24.0	37.6	43.9	18.5	15.9
Gas-works							
Dr. Frankland—first experiment	89.6	107.5	81.9	101.1	110.3	73.3	69.5
Ditto, second experiment	105.6	125.0	96.5	118.1	128.1	87.9	83.8
Ditto, third experiment	127.7	149.2	117.6	141.5	152.6	108.1	103.6

It thus appears that there is a large gain of illuminating power by the judicious use of water-gas, varying with the quantity of water-gas used; and Dr. Frankland considers that in the last experiments of Dr. Fyfe far too little water-gas was employed, hence its action was not fairly tested.

Mr. Barlow has since endeavored to ascertain the relative amount of water-gas capable of being produced by charcoal and coke alone, and in connection with the production of gas from cannel-coal. The apparatus with which he worked at one of the mills where White's hydrocarbon process has been introduced, appears to have been very defective, and many of the conclusions he draws are, therefore, the result of calculation.

I order to ascertain the amount produced per hour, and the composition of the water-gas, four cylindrical retorts were first filled with charcoal, and being heated to a bright red heat, steam was admitted from a boiler. During the first five hours the production of gas amounted to 605 feet per hour, but declined afterwards in consequence of the retorts cooling, the bad arrangements of the furnace, and inferior fuel, to 352 cubic feet per hour for 16 hours. The average quantity obtained during a day's work was 331 feet per working hour.

The gas consisted of—

Carbonic acid	20
Carbonic oxide	20
Hydrogen	60
	100

Had the carbonic acid been absorbed by purification, the result of a day's operation would have been—

Hydrogen	5600
Carbonic oxide	1866
	7466 purified water-gas.

When Newcastle Pelaw Main coke was employed instead of charcoal in the retorts, the gas was of the same average composition, excepting the addition of about 3 per cent. of sulphuretted hydrogen.

The total purified water-gas amounted to—

Hydrogen	3713 cubic feet.
Carbonic oxide	1238 " "
	4951 " "

or 225 cubic feet per hour. The coke was, consequently, not so well adapted to the process as charcoal.

Hydrocarbon gas was then made from 56 lb. charges of Boghead, cannel, and charcoal, the gas being purified by lime. In calculating the relative quantities of gas in the mixture thus obtained, the gas from the cannel itself is estimated on an average of 12,800 cubic feet per ton, which proportional quantity being deducted from the total quantity of gas made, gave the amount of water-gas with which the cannel-gas was mixed.

The proportion of cannel-gas to purified water-gas was then as 100 : 97, and the average yield of purified water-gas was reduced to 140 cubic feet per working hour.

The gas obtained from 4 cwt. of Boghead, cannel, and water, amounting to 5304 cubic feet, was allowed to stand for four hours in the holder. It then contained 14 per cent. of hydrocarbons condensed by bromine, and 7 per cent. of carbonic acid which had escaped the lime-purifiers. Its illuminating power compared with standard sperm candles was found equal to 1573 lbs. of sperm per ton of coal used, which, when compared with the average of 2057 lbs. of sperm from Boghead cannel alone (as the result of Mr. Barlow's experience), showed a loss of 24 per cent. of illuminating matter, the amount of mixed gas produced being 26,520 cubic feet per ton of cannel.

This loss of illuminating power was found to be due to the carbonic acid contained in the gas, and to this cause, or imperfect purification, Mr. Barlow attributes the want of accordance in the results of other experimenters on the hydrocarbon gas.

By passing the gas through another purifier, the 7 per cent. of carbonic acid was reduced ½ per cent., and the illuminating power rose at once from 17.3 to 35 candles, or the removal of 6½ per cent. of carbonic acid from the mixed gas doubled its illuminating power. The total illuminating power of the gas from a ton of cannel by the hydrocarbon process was thus raised to 2842 lbs. of sperm, and a gain of 38 per cent. established over the gas produced in the ordinary manner.

Hydrocarbon-gas prepared from charges of 84 lbs. and 112 lbs. of Newcastle cannel and charcoal, the gas being purified by lime, was obtained at the rate of 29,180 cubic feet per ton of coal.

The proportion of cannel-gas to purified water-gas was as 100 : 205, the average yield of Newcastle cannel taken at 8500 cubic feet per ton, and the average quantity of purified water-gas per working hour being 292 feet.

This gas contained 4.25 per cent. condensable by bromine, 11 per cent. of carbonic acid, without any sulphuretted hydrogen or ammonia.

Burned without special purification, it yielded light equal to 186 lbs. of sperm per ton of coal, while Newcastle cannel alone yields, on an average, light equal to 851 lbs. of sperm per ton of coal, showing a loss of illuminating matter to the extent of 78 per cent.

When perfectly purified from carbonic acid, however, it yielded light equal to 1125 lbs. of sperm, thus showing a gain of 32 per cent. of illuminating matter.

In order to test the opinion thrown out by Dr. Frankland, that the carbonic acid produced in the water retorts was converted into carbonic oxide in passing through the cannel-coal retort, no lime was employed to purify the hydrocarbon-gas from 112 lb. charges of Newcastle cannel and its own coke, but oxide of iron was used instead, which having no action upon carbonic acid, is said to absorb the heavy hydrocarbons. The following results were obtained:

Gas per ton of cannel	23,384 feet.
Hydrocarbons condensed by bromine	5.5 per cent.
Carbonic acid	12.5 "
Value of illuminating matter	182 lbs. of sperm per ton of coal.
Loss in illuminating matter	79 per cent.

The same Gas Purified from Carbonic Acid.

Gas per ton of cannel	20,459 cubic feet.
Value of illuminating matter	931 lbs. of sperm.
Gain in illuminating matter	9¼ per cent.

The proportion of cannel-gas to purified water-gas was here 100 : 94. The yield of purified water-gas was at the rate of 143 feet per working hour. The carbonic acid generated amounted to 26¾ per cent., and the water-gas containing itself, on an average by former experiments, 20 per cent., the difference may be fairly attributed to the cannel-coal, whence it is inferred that no carbonic acid is converted into carbonic oxide in the coal retort. The greatly diminished illuminating power in the gas from this experiment is attributed to the oxide of iron used for purification absorbing much of the heavy hydrocarbons.

The chief difficulties to the introduction of this process of gas-making are, therefore, shown to consist in the uncertain rate of production of the water-gas, and consequent unequal proportion of cannel to water-gas, and the large quantity of carbonic acid which requires to be removed by the purifiers.

Mr. Barlow is of opinion that it will be found absolutely necessary to collect and purify the water-gas in a separate gas-holder, from which a regulated supply can be admitted to the coal retorts, varying at different periods of the process and according to the nature of the coal employed.

The cost of purifying the water-gas from carbonic acid alone he estimates at 4d. to 3d. per 1000 cubic feet of the crude gas, and considers that passing the gas after cooling through a retort containing red-hot coke will be found most practicable. Although the gain in illuminating matter with many kinds of cannel-coal which bear great dilution may amount to 50 per cent., it is not considered probable that the process will be able to compete with the old process in localities where coke and tar return 50 per cent. of the prime cost of the coal used. Thus taking, according to Mr. Barlow's estimate, the London prices for coal and coke in July, 1854, the following figures show the comparative cost of the materials for manufacturing gas equal to 13 candles (per 5 feet burnt per hour), on the two systems:

Cost of Newcastle Common Coal-gas.

1 ton of coal delivered	17	0
9 bushels of coke as fuel, at 3⅓d.	2	7½
Purification of 900 feet of gas, at ⅓d.	0	6¼
	20	2¼
Deduct:		
36 bushels of coke at 3⅓d.	10	6
10 gallons of tar at ¼d.	0	7½—11 1½
Cost of materials for making 900 feet of gas	9	0¾

Or a fraction more than 1s. per 1000 cubic feet.

Newcastle Cannel Hydrocarbon-gas.

6 water retorts producing 600 feet per hour.		14,400
2 retorts carbonizing 11⅝ cwt. of Newcastle cannel		4,887
		19,287 ft. per diem.
Cost:		
11⅝ cwt. of Newcastle cannel at 25s.	14	4½
The coke produced will serve as fuel, with 5⅛ cwt. of coal at 16s.	4	3½
Purification of 19,287 feet at ⅓d.	0	9¾
	19	5¼
Deduct 8 gallons of tar at 1d.	0	8
Cost of materials for making 19,287 feet of gas	18	9¼

Or 11 7-10d. per 1000 cubic feet.

Boghead Cannel Hydrocarbon-gas.

8 water retorts producing 800 feet per hour.		19,200 feet.
1 retort carbonizing 4½ cwt. of Boghead cannel		2,812
		22,012 ft. per diem.
4¾ cwt. of Boghead cannel at 40s.		9 0
Fuel 1,188 lb. for water retorts.		
" 156 " for cannel retort.		
Carbon 396 " for decomposing water.		
1,740 " — 15 cwt. 2 qr. 24 lb., or 4⅝ bushels of coke at 3⅓d.	12	1¼
Purification of 22,012 feet of gas at ⅓d.	0	11
	22	0¼
Deduct 6 gallons of tar at 1½d.	0	9
Cost of materials for producing 22,012 ft. of gas	21	3¼

Or 11 3-10d. per 1000 cubic feet.

No great economy can, therefore, be expected from the process in London and similar localities, where the secondary products are of great value, while in places where fuel is cheap, and coke is comparatively valueless, the process may prove highly remunerative. The above calculations, however, are based upon certain improvements to be made in the apparatus, which shall effect:

1. A constant temperature of not less than 1500° F. in the water retorts, and an expenditure of fuel equal to 60 lbs. for 1000 cubic feet of water-gas.

2. The conversion of the carbonic acid produced in the water retort into carbonic oxide before its introduction into the cannel retort.

3. The supply of the water-gas in such proportions as shall produce uniformity in the quality of the mixed gases.

Webster has obtained a patent for a similar process to that of White. The Messrs. Kirkham have proposed to use hydrogen and carbonic oxide obtained from the decomposition of water for heating purposes, and to naphthalize it for the generation of light. This process was about to be adopted in Paris, when it was interdicted in consequence of the gas being without smell, which, in the event of an escape from the mains or delivery-pipes, would elude detection, and the large proportion of carbonic oxide it contained might prove fatal to the consumer before he was made aware of its presence.

Gillard proposes to render water-gas luminous, which has been prepared as above, by burning it in contact with a solid substance, such as metallic platinum, which, in the form of a wire-work cap, being heated to whiteness by the flame, evolves light. The absence of smell, and consequently of the warning against danger, applies here with equal force, while the illuminating power is not so great.

In connection with these methods of obtaining gas, we may lastly notice a form of double retort, patented by Messrs. Laming and Evans, for distilling oil, resin, tar, and other similar substances, in the lower part of which coal may be placed, while coke occupies a horizontal shelf, or second chamber, above the coal. The oil or melted resin is allowed to fall upon the red-hot coke on the upper shelf, and the gases and tar thus generated are obliged to traverse the coal or coke in the lower part before escaping to the hydraulic main.

The liquids to be distilled are supplied by a syphon-pipe, delivering into a wide inverted funnel above the coke in the upper part of the retort.

Operations of the Retort-House.—Whoever enters for the first time into a retort-house, cannot fail to be struck with its appearance. The iron roof and floor—the absence of windows, machinery, and work benches—the curious appearance of the walls, covered over with complicated iron-work—the darkness of the place—the appearance of the men—all have an aspect of strangeness. But, at intervals of every hour or two, and especially at night, the visitor's attention is suddenly awakened to a startling scene going on within the building. A set of men are seen advancing to one part of the side apparatus; they turn the handles of what appear to be screws; several explosive reports are heard, followed by the removal of circular iron doors or covers, about a foot in diameter; a burst of flame then issues from each orifice from which a cover has been taken; and, on going in front of one of these openings, there will be perceived a mass of intensely burning coal, or rather coke, extending back to the depth of six or seven feet. Then will follow the removal, by means of rakes, of all the burning materials from each aperture; then the hissing and steaming consequent on the wetting of the coke by buckets of water; and, lastly, the recharging of the heated cavity with fresh coals. It is not until after witnessing this series of operations that a stranger can rightly understand the arrangements of such a place.—*Dodd.*

Greenpoint, N. Y.—The genius of silence reigns over this company. Will not somebody give us information of what is going on there?

Nashville, Tenn.—The gas-works of this place have been compelled to suspend operations, owing to a scarcity of coal.

WATER-WORKS OF AMERICA.

Jersey City, N. J.

We have received the fifteenth report of the Board of Water Commissioners of Jersey City, N. J., together with the report of the Superintendent and Engineer.

Extensive repairs and enlargements of the water-works have been projected; some portions of these are now in progress. Every part of the works that needs repairs, renovation, or better protection against decay and delapidation, will receive such attention as shall be deemed necessary to ensure durability. A great deal of this kind of work has occupied the Board during the half year just ended; a larger amount remains to be done.

True economy in the construction and maintenance of water-works demands that all its structures should be made with a view to the greatest attainable durability; and that when made they should be kept constantly in perfect repair. The neglect of this rule would, in the course of a few years, necessarily require annual expenditures for maintenance that the public would certainly stigmatize as exorbitant; and it would, indeed, be the inevitable penalty of negligence and improvidence as to the quality of original construction and of inattention to timely repairs. As far as is practicable the Board have resolved to remove from these works the capacity of thus devouring the annual resources in coming years.

By the report of the superintendent and engineer it will be perceived that the second cornish pumping-engine has been completed, and has begun its services at the engine-house; and that preparations have been made for a second main-pipe of three feet in diameter, from the receiving-reservoir at Belleville to the distributing-reservoir at Bergen.

The duplicated cornish pump removes any further apprehensions, so long endured, of accidental failure of pumping power, while the new main will ensure the delivery to the consumers of water an abundant supply for all *proper* purposes for many years to come, without another general enlargement.

The rapidly increasing demand for the use of manufactories, railroads, ferries, and at the wharves, as well as for additional private dwellings, makes the present capacity for supply too small. The distributing-reservoir is gradually running down. The expectation of replenishing it depends upon the partial completion of the new main before this reservoir shall have been entirely emptied.

Portions of the old main, upon the meadows, have been found to be settling down into the soft mud, and causing thereby strainings of the joints and also leaks. It is purposed to remedy this difficulty wherever it is found to exist, by placing solid supporters under the pipe. The new main will be completed before winter, from the Belleville reservoir to within a few feet of the Hackensack river. The contractors for the pipe will furnish some 1,800 feet more than can be laid during the present season; and this surplus will enable the work to be resumed early in the following season.

It is regretted that all the pipe needed to complete this main was not contracted for at once, as prices have so much advanced in the meantime.

To complete the main, provision will have to be made for crossing the Hackensack river, and for about five thousand feet of additional pipe. In the meantime a material increase of supply will be effected by uniting the two mains at the west side of the Hackensack river.

The importance of the engineer's repeated recommendations in favor of an additional supply-pipe, from the Bergen reservoir into the city, is acknowledged, and their adoption is recommended. The rapidly extending distribution of the water in all directions affords a strong reason why an additional feeder should soon become necessary to the completeness of the supply, especially as it regards effective pressure in the parts of the city most remote from the reservoir. Besides this it occasionally becomes necessary to disconnect the supply-pipe for repairs, or for lowering it to adapt it to the grades of the streets. This has occurred twice, at least, within the last year. On each occasion the communication between the reservoir and the city had to be wholly suspended for several hours. The risk at such times is a fearful one; and such as the property of the people ought not to be subjected to for a moment. A conflagration at such a time would be almost certain to destroy many times the amount that the additional supply-pipe would have cost.

ENLARGEMENT OF THE WORKS.

In the report of January last it was stated that "since July 1, 1857, an extension of the construction of the works has been progressing, amounting, on the 1st of July, 1861, to $52,330 20." About half of this had at the latter date been paid on account of the stand-pipe, and the new cornish engine. The rest was chiefly for the extension of pipe in the city. Up to January 1, 1862, only $31,000 of this expenditure for extension of the works had been funded in bonds. The remaining $22,330 20 then yet remaining due, in part to the general revenue accounts, from which the larger portion had been abstracted and not restored; and a part thereof was discovered to have been derived by means of the temporary loans which had long been kept on foot for sewer building.

The board have no authority to draw from either of these resources for the payment of extension of the works. The only proper and legal course is to issue bonds for such expenditures. The revenue surplus is appropriated to redemption of bonds, and the sewerage loans are entirely foreign to, and distinct from, both revenue and extension accounts, and must not be allowed to blend with either. A strict observance of these distinctions is necessary to the real exhibition of the financial condition of the works.

This residue of $22,330 20 will, therefore, be funded and represented by bonds, along with the expenditures for the completion of the extensive enlargement of the works now in progress, as above stated. The same rule should be strictly followed as to every expenditure, for what belongs properly under the head of construction or extension.

The entire completion of the enlargement of the works is looked forward to with much interest. The work will require a considerable addition to the water debt; but the permanent advantages to the city ought to be proportionably enhanced thereby.

WASTEFULNESS OF WATER.

But, how long will it be before another similar enlargement will be demanded? If it is determined to persevere in the folly of a profligate wastefulness of the abundance of water, one or more additional mains will again be clamored for, before a suitable progress shall have been made in the redemption of the present funded debt; thus a hopeless accumulation of debt would be established. If, on the contrary, ordinary prudence be exercised, and the growing habit of wastefulness be repressed, any considerable addition to the debt for general enlargement will be postponed until the present liabilities shall have been so far reduced as to make the next general enlargement but a light burthen. By such a course it will be competent for the works to become so far relieved from debt, as eventually to warrant the reduction of the water rates much below the present grades. By the other course, if unabated, the city can never cease to increase its water debt.

MEASUREMENT OF THE WATER.

The system of actual measurement of the water, to the larger consumers, proves to be an excellent one. The water is furnished to them at a price but a trifle over actual cost of delivery; each one pays for all that he receives, and no more. The inequalities and uncertainties of the former system of charges, to this class of consumers, are completely abolished, while the aggregate of revenue derived from them collectively is increased. For the purpose of obtaining information as to the use of the water, by persons who pay a fixed annual rent, for several months past, meters have been attached to a number of private residences. This has been done for observation merely, and to obtain statistics upon which may hereafter be founded a more just and equitable system of charges to private consumers.

Some curious revelations are made by these meters. It is enough to say, at present, that by the existing fixed rates upon dwellings, some are found to pay for the quantity consumed by them, three cents and upwards per one hundred gallons, while others pay less than one-fourth of one cent per hundred gallons. Now, when it is remembered that the current cost of the delivery of one hundred gallons to the consumers is about nine mills, it will not be strange if the public should, after a while, demand from the board the universal application of the meter system throughout the city. It would certainly be a fortunate occurrence for the general interest of the city. The majority of consumers would be great gainers by such a measure, and the aggregate of revenue need not be diminished thereby.

If the gas company should adopt the plan of charging a fixed price per annum for their commodity, to each house of certain dimensions, irrespective of the quantity used, it is evident that such regulation, in order to compensate the company, would require a general rate, which would bear with oppressive inequality upon the economical consumers. The same consideration pertains with still greater force to water-works, and indicates the reason why, in some cities, under the present system, the accumulation of the water debt appears to be constantly becoming more and more disproportioned to the revenue, even though the house rates are kept high. There is but a slight possibility of the reduction of the house rates in Jersey City so long as this evil exists. Waste must be at least partially paid for by somebody, or the works must become more and more burdensome in a financial aspect. The economical consumer, in fact, pays for the profligacy of his neighbor. The principal obstacle to the universal use of the meter is the cost of a reliable instrument. Could this objection be overcome by some fortunate inventor, he would confer a valuable benefit upon many cities and towns in this country. In the meantime, a partial remedy here may be founded upon the information which is being collected through the private meters above mentioned.

SINKING FUND.

By the registrar's report and statement of the sinking fund, it will be seen that $5,267 05 was added to that fund on July 1.

This increase consists of the surplus from the revenue of the last year, being $4,256 98, and of interest on money in the fund, being $1,010 07.

On the 1st of July, 1862, this fund had received, in all, $38,554 76, as surplus and interest, since July 1, 1858, when the first surplus began to accrue after the close of the original construction account in July, 1857.

By means of this fund seventeen of the bonds of 1877 have been redeemed and cancelled.

Fifteen thousand dollars remain invested in water bonds sold to the fund on account of the current extension of the works, and $6,101 61 is deposited in bank to the account of the fund, which sum, or at least $6,000 of it, will be immediately invested in construction bonds.

The means are on hand for redeeming and cancelling twenty-one more of the bonds of 1877, whenever they can be obtained from holders willing to part with them. The board are willing to pay for such bonds the market price, or to give in exchange for them the bonds invested for the fund, which are payable in 1883 and 1891.

The surplus of the past year would have been much larger than it is had not extraordinary and expensive repairs of the main buildings at Belleville, and of the gate-houses at both reservoirs become needful. The premature dilapidations of important parts of these structures, from causes for which we are not responsible, required instant and thorough correction. Postponement would only have accelerated the progress of the damage, and made its repair still more expensive. These repairs will be continued through the greater part of the present season, and will, consequently, affect the surplus of the current year.

ENGINEER'S REPORT.

Mr. Bacot, chief-engineer of the water-works, reports that the works have remained in general good condition, and a supply of water adequate for all necessary purposes has been maintained, without accident or interruption.

The operations of the pumping-works are shown in the annexed table, marked "A." During the past six months the West Point engine has worked 577 hours 32 minutes; the Jersey City engine 1,142 hours 18 minutes; total pumping time, 1,719 hours 50 minutes. Gallons of water delivered into the receiving-reservoir, 443,187,056; consumption of water, 453,984,556 gallons. 346½ tons of bituminous, and 165½ tons of an-

thracite pea coal; total 512 tons, being about 30 tons less than the previous six months' consumption.

PUMPING-ENGINES.

The new casting, mentioned in the January report as required for the lower valve chest of the Jersey City engine, was finished and put in its place by the contractor, in February last, to which time the West Point engine was continued in operation. On the 5th of February the new engine was put in motion, and after two weeks of preparatory working, a trial of duty, as required by the contract, was obtained. On the 21st and 22d of February the engine was put under test, running six hours on each day, and performed the duty of raising 63,000,000 of pounds of water one foot high, with a consumption of 100 pounds of coal. The engine continued to work in a satisfactory manner until the 1st of June last, when the West Point, having been thoroughly overhauled and repaired, was again started.

The completion of the new engine forms an important addition to the security and efficiency of the works. Its successful operation, thus far, leads to the anticipation that it will satisfactorily perform the duties required from it. The sum of $5,000 has been retained by the board for twelve months from the completion and acceptance of the engine (February 5th, 1862), as a guarantee that all imperfections which may appear, or accidents which may occur, during this time, through fault of material or workmanship, shall be made good by and at the expense of the contractor.

The boilers, although in constant use for eight years, remain in good condition and without leaks. Additional steam space, found to be necessary, is now being supplied by the erection of steam drums, thirty inches in diameter, over the boilers. The covering of coal ashes, hitherto used for the prevention of radiation, has been removed, and hair felting substituted.

ENGINE-HOUSE AND GROUNDS.

The condition of the walls, stone-work and roof of the engine-house building has become such as to make extensive and thorough repairs indispensable to the preservation of the building.

The Staten Island brick, with which the exterior walls are now faced, has been gradually crumbling and falling off by the action of the weather, and the inferior quality of brown stone used for trimmings, copings, etc., is loose, and in many cases liable to fall upon those employed about the building. The position of the gutters upon the top of the walls, behind the battlements, has also been a cause of great injury to the walls and interior of the building. The work of putting the building in permanent repair is now in active progress. In doing so, the entire facing of the north and west walls will be removed, and hard coloback brick, laid up in hydraulic cement, substituted. The stone-work necessary to be taken out will be replaced with brown stone selected from the quarry at north Belleville.

The eaves of the roof will be projected three feet clear of the sidewalls, and the gutters formed therein.

This work will be completed during the present season.

COAL-HOUSES

Have been erected in the rear of, and about thirty feet distant from, the engine-house. The building is 124 feet in length, by 29 feet in depth, the interior divided into four compartments by partition walls. Coal will be deposited into the building from the road-way on the top of the bank, through coal shutes built in the wall; two of these openings communicate with each compartment. The building will conveniently store 1,000 tons of coal.

RESERVOIRS.

The opportunity afforded by lowering the water in the receiving-reservoir, to provide gates for the chamber in the gate-house, through which the new 36-inch main will be supplied, was taken advantage of to examine and repoint the brick lining of this basin. A few slight cracks only were discovered, and these within three or four feet of the top of the bank. Further examinations will be made when the gates are being attached.

The distributing-reservoir is in good condition.

The water weed, which appears annually, in the spring in this reservoir, and grows from a width of fifteen to twenty feet around the margin of the basin, is cut and removed as soon as the plant reaches the surface of the water, and before its decay takes place. The timely removal of this vegetable matter prevents, it is believed, the discolored appearance and unpleasant taste formerly noticed in the water, during the months of July and August.

NEW THIRTY-SIX INCH MAIN.

Since the last report an additional 10,000 feet of 36-inch cast-iron pipe has been contracted for with the Warren Foundry and Machine Company, on the same terms as the former agreement, viz: $37 per ton.

A contract has also been entered into with the Patent Water and Gas-Pipe Company, of Jersey City, to lay 2,000 feet of wrought-iron and cement pipe, 36 inches in diameter, to form a part of this main. It will be laid on the eastern slope of the Belleville ridge, commencing about 100 feet from the meadow edge, and be extended up the hill, westwardly, for the distance named. The company have agreed to take up this pipe if found, after trial, in any way unsuitable for the purposes required, and substitute cast-iron pipe therefor. The price for this pipe, when laid complete, including trenching, back filling and grading, will be $7.85 per lineal foot.

The contracts now entered into will provide for the completion of the new main from the Belleville reservoir, eastwardly, to a point about 150 feet from the westerly shore of the Hackensack river, where it will be temporarily connected with the present 20-inch main by a special casting or Y branch.

In April last the Warren Foundry and Machine Company commenced the delivery of pipes on the wharf at the Hackensack river. About 800 pipes, with a few special castings, have been landed and distributed along the line by Messrs Keeney & Halladay, the contractors, for laying the main. Each pipe and casting, as soon as landed, is subjected to a careful hammer inspection, in addition to the hydraulic tests and inspection applied at the foundry. The pipes received thus far fullfil, in every respect, the requirements of the contract, and fully sustain the reputation of this establishment for producing sound and reliable castings. The pipes are 1 1-20 inches thick, 12 feet 5 inches in length, averaging 4,800 pounds in weight.

The socket and spigot ends of the pipes are so formed that the lead, when run, assumes a wedge shape, thereby materially increasing the security against leaks and the blowing out of the caulking.

The excavations made on either side of the present 20-inch main, for several successive years, to restore its covering, rendered it unsafe, and in a measure impracticable, to lay the new main on the yielding foundation of mud which remained.

The difficulty experienced of detecting and repairing leaks in the present pipe, portions of which have settled below the surface of the meadow, made a permanent foundation for the new main indispensable. The following plan, therefore, has been adopted for laying this foundation and securing the materials of which it is composed, from decay:

Two rows of piles are driven, three feet apart, to a solid foundation, which is found at a depth varying from 12 to 20 feet below the meadow surface. The heads of the piles are then cut off 16 inches below the meadow, and cross capped with 10x12-inch pine timber; upon this capping a brick pier 12 inches thick, 44 inches long, and 13 inches high, is laid up in hydraulic cement.

The pipe when placed upon this pier is securely held in its position by additional courses of brick-work built up on its sides. The piling and capping are thus kept constantly immersed in water, rendering it perfectly secure from decay, and the joints of the pipe being just above the meadow surface enable them to be caulked without difficulty.

The contractors have now completed about one mile of the pipe, and the operations of laying being carried on from both ends of the line, its completion may be expected in the ensuing fall.

METERS.

The system of meter measurement, to consumers of large amounts of water, has been in operation during the year. Its success is shown both in the large amount of water saved and in the increased revenue from this class of consumers. The low rate at which the water is furnished by meter (one cent per 100 gallons), together with the certainty of the amount used, has overcome the opposition which was at first experienced, and most of the opponents of the plan have become, after a fair trial of the system, its warmest advocates. The successful results of the plan, I consider in a great measure owing to the efficient and reliable meter used. Of the 100 meters furnished by Mr. H. R. Worthington, of New York, and in operation on our works for the past year, but two or three have required repair. In these cases the meters were placed in positions where large amounts of water were required to be rapidly supplied, and were subjected to a greater duty than was appropriate to their size; this was remedied by attaching an additional meter to the service and by thus dividing the work of each, no difficulty of the kind has been since experienced. The important advantages possessed by this meter over those heretofore used, consist in its simplicity of construction, the uninterrupted flow in the delivery of water, and its reliability, as tested by its satisfactory operation for the past five years.

The extension of meters is shown in the accompanying table marked "C."

TABLE A.

Statement of the Quantity of Water Pumped and Consumed from January 1, 1862, to July 1, 1862.

MONTH.	Number of strokes made by the pump.	Engine. H.	Engine. M.	Engine work.	Number of gallons of water pumped.	Lbs. of bituminous coal used during pumping time.	Lbs. of anthracite coal used during pumping time.	Lbs. of bituminous coal used for banking fires.	Lbs. of anthracite coal used for banking fires.	Total lbs. of coal consumed.	Gallons of water consumed per month.	Gallons of water consumed per day.
January....	West Point....	277	43	139,557	73,406,982	121,182	60,590	14,100	6,500	202,373	81,101,982	2,632,322
February...	Jersey City...	281	30	133,471	70,205,746	109,580	54,760	12,000	6,000	182,290	76,697,496	2,739,196
March.....	do ...	306	11	147,589	77,631,814	118,530	59,260	14,000	7.100	198,890	77,631,814	2,504,252
April.....	do ...	279	27	134,409	70,699,134	105,086	54,286	13,069	6,531	178,972	71,259,134	2,375,304
May.....	do ...	312	25	15.,267	79,617,960	106,700	78,000	10,700	10,000	205,400	79,337,960	2,559,289
June.....	West Point....	262	34	136,170	71,625,420	134,300	25,800	18,900	.....	179,000	67,956,170	2,265,205
		1,719	50	842,463	443,187,056	695,829	382,696	82,769	36,131	1,146.925	453,984,556	2,512,594 average.

TABLE B.

Statement of Pipe Work connected with the Jersey City Water-Works.

PIPES.	36 inch.	26 inch.	24 inch.	20 inch.	16 inch.	12 inch.	10 inch.	8 inch.	6 inch.	4 inch.	3 inch.	Total feet.
Laid prior to January 1, 1862....	2,743	3,420	96	38,472	2,861	14,874	885	512	85,958	9,315	2,988	162,119
Laid to July 1, 1862.....	.....	85	.....	.....	.....	1,749	.....	... ..	2,958.6	345	278	5,415.6
	2,743	3,505	96	38,472	2,861	16.623	885	512	88,916.6	9,660	3.261	167,584 6

Total length of pipe laid, 31 miles, 3,863 feet.

TABLE C.

STATEMENT *of the number and sizes of water meters now in use by the Jersey City Water-Works, to July 1, 1862.—(Continued from fourteenth report).*

The table of meters in use by the Jersey City Water-Works mentioned in their fourteenth report, will be found on page 5 of the present volume of this JOURNAL.

WHERE APPLIED.	SIZES OF METERS.			
	⅜ in.	½ in.	1 in.	¾ in.
Erie Railway ferry, additional	....	1	....	....
Joseph Colwell & Co., Harsimus st., ship yard	1	....	....	....
Louis Rutherford, Belleville Ridge	....	....	1	....
Moon's machine works	....	....	....	1
Gardner's drug store, Newark avenue	....	....	....	1
Previously reported, January 1, 1862	11	9	19	42
Total number in operation to July 1, 1862	12	10	20	44
Meters on hand not set	....	1	....	9
Total number of meters (96)	12	11	20	53

BOARD OF WATER COMMISSIONERS

OF JERSEY CITY.

May 1st, 1862, to May 1st, 1863.

JACOB R. WORTENDYKE, President.
EPHRAIM PRAY,
DELOS E. CULVER,
GEORGE MCLAUGHLIN,
ORESTES CLEVELAND, President of the Common Council and ex-officio Water Commissioner.

OFFICERS:

Superintendent and Engineer, ROBERT C. BACOT.
Registrar, GARRET S. BOICE.
Assistant Registrar, ISAAC F. BOICE.
Water Purveyor, JAMES FLEMMING.
Eng'r at Pumping works, ROBERT S. OSBORN.
First Assistant Engineer, WILLIAM KEARNEY.

SANITARY CONDITION OF NEW YORK CITY.

The annual report of Mr. Delavan, City Inspector, has been published. It is a comprehensive document, and enters in detail into the evils under which many classes of our citizens labor. To use the words of a daily contemporary—"The only conclusion that one can come to, in reading the reports of this Department from year to year, is that things are all wrong. The city is in bad condition; its streets, with the exception of Broadway, are filthy; it has a bad system of sewerage and drainage; thousands of its people live in cellars whose atmosphere is death; slaughter-houses, livery stables and fat-boiling establishments are scattered all over it; barrels of abomination and heaps of ashes line its sidewalks and block up its gutters; some of its piers are used as permanent depots for the accumulation of street manure, and the air is 'poisoned with the stench emitted by these reeking and pestiferous mounds of uncleanliness.' And yet, notwithstanding the fact that these nuisances, and a hundred others, are patent to every eye, and recognized by every sense, the officers whose duty it is to attend to the sanitary condition of the city can take no cognizance of them, nor adopt any measures to remove them. According to the City Inspector, they have no power to do so. The streets and all their dirt are in the hands of Contractor Hackley, who neglects his work, assigns his duties to sub-contractors, and only secures for himself enormous profits." This Hackley contract is one of the most iniquitous swindles ever perpetrated upon a community, and should at once be rescinded; it is a pity the law cannot punish the perpetrator of it, for he not only now pockets the money of the city without rendering any service, but prevents more honest and conscientious contractors from cleaning the streets properly, and as it was intended this Hackley should do.

Mr. Delavan discusses many plans of sanitary reform, and refers to the defects of his department, the powers of which are in his judgment too limited to secure the beneficial results which ought to grow from its administration. Among the other subjects claiming his attention is that of sewerage, to which he thus refers:

SEWERAGE; LAND AND HOUSE DRAINAGE.

"A more complete and effcient sewerage of the city, and the drainage of lands and houses, are of such vital necessity that any suggestion of sanitary improvement that does not regard them as the groundwork of its action, would be unworthy consideration. Our city authorities, however neglectful for a long period of this primary necessity, have of late years done much for the atonement of past neglects, and the best results have already flowed from their yet imperfect action. As a proof of its partial success, it is only necessary to compare the mortality of the present day with the mortality of the period when our population was almost a third less than it now is. To the liberal but still sadly deficient improvements in sewerage may in a great measure be attributed this improvement in our sanitary affairs. However other experiments may have failed in producing the results foretold by their projectors, there has never been with ourselves, nor in any other district where the attempt has been made, any failure in the experiment of sewerage in promoting the health of the localities where it has been adopted. In confirmation of the advantage from this improvement, I will adduce one instance out of many that have come under my observation. In a township of Manchester, England, the mortality of the undrained street was at one time four per cent., while in the drained districts it was two per cent. Another instance is given where the mortality before sewerage was one in thirty-two; after sewerage, it fell to one in fifty. Similar results have in all instances followed the introduction of sewerage and drainage. But this sewerage should always, if practicable, be in advance of buildings, and where new streets are opened the work of sewerage should be done at once. By the adoption of this plan immediately to the streets now in the process of opening in the upper part of the city where there is much sickness from fever arising from marshy and unfilled lots, the health of these localities would be greatly improved, and the new residents be spared from visitations to which they will be liable should the work of sewerage be delayed until a later day. In all cases where sewers are laid, it should be made compulsory by ordinance, on the owners of tenement houses especially, to have the drainage and water closets of such buildings connected with the sewer, principally as a sanitary measure, but at the same time as an act of necessity to those occupying these abodes.

"But while these improvements are suggested, it is equally urged that they must be made in the most durable manner possible. Otherwise, says a foreign writer, an ultimate limit is set by the hand of man himself, to dynasties, to peoples and to nations."

NEGLECTED CONDITION OF THE STREETS.

The neglected condition of the streets in certain localities is also alluded to. Those who are familiar with the streets in some of the most thickly populated portions of the city need not be reminded of the offensive piles of filth and mud which abound, and which afford tangible evidence of the criminal neglect of the contractor in not attending to his duties. Mr Delavan says:

"There are still other external causes connected with the tenement and underground dwellings, which are additional incentives to unhealthiness, and to the discomfort of the inmates. It is in these localities, more than any others, that the cleaning of the streets is apt to be neglected either wholly or indifferently attended to. To the ordinary accumulation of street dirt deposited in these localities, is added the impure and decayed matter which they receive from the tenement houses. As a general thing, the streets are narrow, and the buildings high, seldom admitting the rays of the sun for more than a few hours during the day. As a consequence of this state of things, the streets are for the most part either wet or damp, thus producing a vitilated and poisonous atmosphere, which, of itself, is of the worst consequences to the health of the neighborhood.

"In no part of the city is it more necessary that the streets should be kept in a cleanly condition, and in no part are they so much neglected; but the parties occupying such premises are not only the last who would place themselves forward to complain of this neglect, but they are probably the last whose complaints would be listened to by those whose duty it is to keep the streets in a cleanly condition. The cupidity of contractors, whose interest it is to obtain the highest compensation for the smallest discharge of duty, would turn a deaf ear to any remonstrance from such quarters. As these localities thus neglected are out of the line of the great thoroughfares where such neglect is most observable, the contractor may in this instance practice such neglect with comparative impunity from complaint on the part of our citizens."

In the statement of the comparative health of New York with London and other cities, Mr. Delevan makes some remarks rather flattering to our city, which we hope may be correct. The following tables are used to prove the correctness of his statements:

"DEATHS IN LONDON TO EACH MILLION OF POPULATION.

Deaths.	To the Million.
1858—64,093	23,102 1-11
1859—62,616	22,569 2-3
1860—63,100	22,744 1-6

NEW YORK CITY—POPULATION ONE MILLION.

Deaths to the Million.	
1860	22,710
1861	22,117
1862	21,244

EXCESS OF MORTALITY OF LONDON OVER NEW YORK.

"Thus it will be seen that during the three years above noted, the mortality of London has been in excess of the mortality of this city 2,344, or 781 in each year; and yet, in the face of these official facts, there has been an effort for years past to impress upon the public, and upon the State Legislature, the idea that the mortality of the city was in excess thousands over that of London in proportion to population. The object of these efforts has been exposed in previous reports; and however unsuccessful their authors may have been in carrying those objects into effect, they have been to some extent successful in disquieting the public mind. Impressions thus raised, however baseless, cannot be other than of an injurious tendency to the prosperity of the city and the business interests of its inhabitants. Misrepresentations of this character cannot be too severely condemned, although it is to be apprehended that they will be again repeated in the face of the most conclusive proof of their utter want of foundation.

HEALTH OF NEW YORK AS COMPARED WITH THAT OF OTHER CITIES.

"In my first annual report to the Common Council, I made use of this language, that 'New York city at this day can lay just claim to the privilege of being numbered with those of the most healthy of the world,' an expression which brought upon the undersigned, from the parties above alluded to, not merely a contradiction, but the charge of willfully misrepresenting facts from personal and political motives. It again becomes my duty to reiterate the statement thus made, and to add to it the assertion that not only does the health of this city favorably compare with that of any other great metropolis, but that it is by far the most healthy of any of them. So far from lamenting our unhealthy condition, we have every cause for congratulation that, notwithstanding the drawbacks to health always presented in closely aggregated communities, we can exhibit a general bill of health superior to that of any large city in the civilized world.

"In the above statement I have not given the mortality of Paris, for the reason that it is known to be greater than that of London, and I have referred more particularly to the latter because the health of that city has been again and again represented as being superior to that of New York."

If these statements be correct, what an incentive it is to the proper authorities to use every exertion to remedy the evils complained of. New York ought to be the healthiest city in the world. Washed by two noble rivers, and situated most favorably for the development of a perfect system of sewerage, if all requisite measures were taken to perfect its sanitary arrangements, the rate of mortality might be sensibly diminished, and it might compare favorably with some other of our American cities, which now far excel it in the point of healthfulness.

INORGANIC CARBON.—A writer in the *Chemical News* gives the following directions for the preparation of inorganic carbon: Intimately mix one part of amorphous phosphorus and two parts of the anhydrous carbonate of soda, both in fine powder; project the mixture, in small portions at a time, into a red hot clay crucible, keeping the crucible covered as much as possible, and not adding each fresh portion of the mixture until the white flame of burning phosphorus (which issues from a small hole in the cover) has quite disappeared. Digest the porous and cooled residue in water, filter, and wash until all alkalinity has disappeared. An abundant residue of exceedingly light carbon will be obtained, which, when dried, will be equal to about four-fifths of the calculated quantity, if the process has been carefully conducted and the crucible kept well covered.

A similar experiment made with anhydrous borax instead of carbonate of soda yielded no boron.

The following modification has on several occasions succeeded well as a lecture experiment: Into a long and narrow test-tube, of German glass, place first a fragment of white phosphorus about the size of a large pea, then fill a length of about two inches of the tube with anhydrous carbonate of soda in powder; support the tube at its mouth in a horizontal position; heat the end of the carbonate most distant from the phosphorus to redness by a lamp, and then apply the moderate heat to the phosphorus by gradually shifting the lamp towards that end; the instant the phosphorus melts and volatilizes, the whole of the red hot carbonate becomes quite black, and exhibits a striking contrast to its previous whiteness.

GAS IN BRAZIL.—The city of Belem, the capital of the province of Para, Brazil, is about to be lighted with gas. The capital stock, amounting to 100,000 livres, has been subscribed, and the contract to build the works has been given to Messrs. Pelo and Betts.

PETROLEUM ITEMS.

Origin of Petroleum.—Dr. J. B. Edwards, in the *Pharmaceutical Journal* remarks that the flow of oil from mineral springs is by no means new, either to science or commerce. Herodotus has recorded that the Island of Zante furnished large quantities, while Pliny and Dioscorides describe the oil obtained from Agrigentum, a small town of Sicily. The Persian springs at Bakoum have yielded to the value of 600,000 dollars annually; and the earth oil from Rangoon, in Burmah, has been exported to the extent of 400,000 hogsheads annually. The streets of Genoa and Amiens were formerly lighted by a petroleum obtained from Parma. In 1847 a spring was discovered in Yorkshire, which was successfully worked by Mr. James Young, of Glasgow, until exhausted, when he turned his attention to the distillation of coal, and discovered paraffine oil. The marvellous oil springs of the New World, however, far surpass in extent and interest all previous discoveries; and the quantities already yielded, without apparently diminishing the supply, show that this will be a most important article of commerce for some years to come.—*London Builder.*

Storing of Petroleum—Vessels for Exportation.—A correspondent of the *Scientific American* discusses the subject of the volatility of petroleum, and the best manner of storing it, and providing suitable vessels for its exportation. We quote the following from his letter:

"It was stated before the Committee of the Common Council of Brooklyn, after the great fire which destroyed the petroleum yard of Messrs. Schieffelin Brothers & Co., last summer, that the cause of the fire was as follows: 'The day being hot, a large quantity of the subtle gas was generated in the hold of the lighter, and when the hatches were removed, this gas came in contact with the oxygen of the atmosphere and exploded, causing the death of two persons and the loss of a vast amount of property.' It was also stated that there were two gases generated— light gas and a heavy gas; and afterwards that the gas generated from this oil or petroleum was always lighter than the atmosphere. In nearly all cases, writers who have attempted to elucidate this subject, have spoken of the gas or gases generated by the distillation or evaporation of petroleum. Now, a *gas* is a permanently elastic aeriform fluid, in many instances incondensible by any means we possess; but a *vapor* is an elastic fluid easily condensed by cold. We do not say when we distill water, that we convert it into gas and then condense it; we say that we convert it into steam, or vapor, in which form it is easily condensed by cold. If we converted the water into the two gases of which it is composed—hydrogen and oxygen—we could never condense them by any cold or pressure which we possess. In distilling petroleum, or when it evaporates in the open air, only the *vapor* of petroleum is produced. This vapor is easily condensed by cold, and even when generated from the lightest part of petroleum, or naphtha, it is always heavier than atmospheric air. I have often seen it flow over the sides of a tank like water, when I have had occasion to elevate the temperature of naphtha by steam up to 150° or 180° Fahrenheit. Mr. Lockwood, the superintendent of Messrs. Schieffelin Brothers' petroleum yard, once said to me:—'Can you inform me why it is that a fog sometimes hangs around the barrels in our petroleum sheds, when we open the doors in the morning?' I said:—'Yes, your barrels leak; the air around them is saturated with the vapor of petroleum; and when you open your doors, the cold air rushes in and condenses the vapor so fast that it is visible like a fog.' The writer has said to parties who were constructing sheds for petroleum, that they ought to be made with open-work on the sides, so as to allow the air to sweep through them, and remove these vapors as fast as they are formed. When ships are loaded with petroleum, it should be arranged, if possible, to remove this vapor from the hold by ventilation, as fast as it accumulates. It will be remembered that the vapor of petroleum, or naphtha, when mixed with atmospheric air, in the proportions of from six to twelve parts of air to one part of vapor, forms a very dangerous and explosive mixture when brought in contact with flame. The best plan for exporting crude or refined petroleum would be to construct vessels of iron, with partitions or bulk-heads, so as to make permanent tanks into which the oil could be poured, and the man-hole plates screwed and packed so securely that a fire might be built over them without danger; and as the oil is lighter than water, the ship might be so constructed that she could not sink or founder at sea. On the arrival of the ship at her port of destination the oil could be removed into barrels or tanks, by pumps, in less time than is required to discharge a cargo now. Insurance on such a vessel could be effected at a very low rate. I think vessels of this description will eventually be loaded from oil-ducts, reaching perhaps as far as to the oil wells in Pennsylvania, if the vast store-houses of these oils do not soon become exhausted, and we see no reason why they should, when we consider the vast extent of our coal-fields, and the fact that in some parts of the world there are flowing wells which are known to have been yielding their products for more than two thousand years."

Retrospect of the Oil Trade of 1862.—A recent number of the Philadelphia *Coal Oil Circular* reviews the markets of New York, Philadelphia, Boston, Pittsburgh Oil City, Baltimore, and San Francisco. These statistics are very complete, and their value will be apparent to all parties engaged in the oil trade. By this retrospect we are informed that the foreign exports of petroleum in 1862 from this city alone amounted to 6,783,563 gallons, valued at $2,037,413, while from Boston there were exported to foreign ports 891,616 gallons, valued at $457,859. In this city the lowest quotations for crude oil were on April 26th, when 8 @ 12½ cents per gallon was the price. The highest quotations for the year were November 19th when the price was 50 @ 52½ cents, (packages included.) In May and June the price of refined oil was only 21 @ 25 cents. In November it was quoted 95 @ $1 10 (packages included.)

Panic in the Canada Oil Region.—A great panic is being experienced in the petroleum region of Canada, and a large number of the most noted flowing wells have suddenly stopped. We quote the following from the Oil Springs *Chronicle* of January 15:

"Oil matters at the Springs at present are in a highly unsettled state, and we find it difficult to form any definite opinion as to the effect the existing panic among oil men generally, occasioned by the almost universal cessation of the flowing wells, will have in relation to the future price of oil. Probability is, however, that the present excitement will soon subside into a stern realization of the true position of affairs and restore the usual equanimity. Pumps will be put down as fast as possible to obtain a portion of what was yesterday spontaneous; and then when the supply—or rather capacity of wells already down—is ascertained—the demand being pretty accurately known,—a nearly uniform price will be the result. At present different parties, for small lots, are asking one to three dollars per barrel at the well. Contracts for future delivery cannot be negotiated to-day.

"The first noticeable intimations of this wholesale failure of the flowing wells commenced on Thursday and Friday of last week, when several of the principal wells commenced pulsating, and finally wholly stopped or continued to yield only periodically. From best information, the following is the condition of affairs at date: Shaw well, failed (to flow is always understood) entirely; Bradley well, same; Wilson well, do.; Whipple, do.; Campbell & Forsyth, (two) do.; Shannon, (formerly) do.; Sifton, one certain, do.; the other, not known; Ball & Brennan, pulsating with a flow of about 30 barrels per 24 hours; Cady, Solis & Co., stopped at one time, but to-day is running about one-half or two-thirds usual quantity; Pardy, about 30 barrels per day; Campbell, totally, we believe; Shepley & Webster, very small stream to-day, none yesterday; McLean's, not known; Evoy, 300 bbls. If any wells have been omitted in the list above we shall take occasion to enumerate them next week."

Capacity of Petroleum Refineries in Canada.—The *Chronicle* estimates that it will require upwards of 4,000 barrels of crude oil to charge, a single time, all the stills now in Canada. This home demand, together with the demand for foreign shipment, and the cessation of so many of the flowing wells, must have the effect to quadruple the late ruling prices. Some buyers and refiners outside may look upon this as "sensation," but we assure them it is fact, and here all are sensible of it.

Suffocated in a Petroleum Still.—A boy engaged in a petroleum refinery in Oil Springs, C. W., while cleaning out a still was suffocated by inhaling the gas and vapor evolved, and was taken out supposed to be dead. On reaching the fresh air, however, he recovered.

Danger of Fires from Petroleum.—Fire Marshal Blackburn, of Philadelphia, in his annual report to the Councils of that city, makes the following allusion to the danger resulting from the use and promiscuous storage of petroleum:

"Another year's experience has fully satisfied me of the correctness and importance of the recommendations made in my last annual report in regard to coal oil. The past year has been prolific in fires and other casualties from this article Some of the instances have been truly frightful and sad.

"In the month of February, a varnish factory, located in a thickly inhabited neighborhood, where benzine was used as a substitute for turpentine, was blown to pieces by an explosion, its owner instantly killed, and a workman enveloped in flames, was hurled through the air, and thrown upon the ground, the distance of fifty feet from the demolished building, and was, of course, dreadfully wounded.

"The fatal and threatening conflagration, caused by an explosion aboard the schooner *Pratt*, which was loading with crude oil at Christian-street wharf, in May last, raged for fourteen hours, the flames baffling all efforts to subdue them, notwithstanding at least twenty streams from the most powerful steamers in the Fire Department were playing on the blazing mass at once. The dry-dock of Messrs. Simpson & Neill, one of the most important institutions of our port, as far as its shipping interests are concerned, narrowly escaped destruction from the ravages of this fire, and the marine underwriters of Philadelphia had to foot a heavy bill for damage done to the *Grey Eagle.*

"During the past year the cupidity of parties engaged in the coal oil traffic has induced its storage—sometimes in immense quantities—even in the very centre of business marts, and also in the most densely populated localities, regardless alike of the convenience of trade and the comfort of the people, provided buildings could be obtained at cheap rates, and were so situated as to suit the selfish purposes of dealers in shipping the oil or sending it to refineries.

"In a most glaring instance of this kind, the condition of the families in several blocks of houses, surrounding the place where the petroleum was deposited, was rendered intolerable by the stench arising from the article. In the absence of any ordinance or statute to enforce in their behalf, they appealed to the common law, and the party complained of was prosecuted for maintaining a nuisance, detrimental to the health and dangerous to the lives and properties of the complainants. With the view of testing, before the Court of Quarter Sessions, whether the offence charged was a nuisance, under your direction I urged its speedy trial before a jury, who found the defendant guilty, and the court compelled him to abate the nuisance.

"I would, therefore, again urge the necessity of judicious legislation relative to the locating of coal oil distilleries in this city, and also for regulating the transportation, warehousing, and shipment of petroleum and its products."

Oil City, Pa.—From the Philadelphia *Coal Oil Circular* we quote:

"We learn that the oil market continues flat, and that further concessions have been made. The Western refiners buying but sparingly, and the demand from the Eastern markets reduced, prices have again declined to $1.00 per barrel. Several sales at the different wells have been reported, ranging from 50 to 62½ cents, and again from 82½ to 90 cents. A lot of 10,000 barrels sold as low as 44 cents per barrel, packages $2 extra."

The New York Market.—Up to January 23d the market closed dull, with a decline. An exchange says:

"Crude opened firm, with sales at 25 cents, gradually receding to 23 cents, and to-day we learn that 22½ cents has been accepted; closing heavy at the latter quotation, with a still downward tendency. Refined opened briskly, with sales of several thousand barrels at from 42½ to 47½ cents for prime, free and tax paid, gradually declining until to-day, when sales were made at from 37½ to 42½ cents. Refined in bond in good demand, with sales at from 35 to 40 cents; several sales at higher rates and future delivery are still circulated, but altogether nothing very positive above the usual rumors and hear-says,

"The exports for this week have been unusually large, being 524,778 gallons, valued at $237,942, as compared with same time in 1862, being only 21,091 gallons, valued at $9,705, showing a handsome increase of 503,687 galls., valued at $216,851."

Inflammable Gas Air.—Mr. S. E. Turner, of Birkenhead, has patented an invention which relates to an apparatus for burning a mixture of inflammable gases and air, now in use, wherein the inflammable gas escapes from a jet placed inside a cylinder open at the bottom, and covered at the top with a diaphragm of wire gauze, or finely perforated plate, so that atmospheric air enters the bottom of the cylinder, and, mixing with the inflammable gas issuing from the top, assists the combustion of the same, which takes place on the top of the diaphragm. To render the combustion in such an apparatus more perfect, one or more metal tubes are introduced into the bottom cylinders wherein the mixture of the gas and air takes place; such tubes are open at the bottom, and pass up through the gauze into the combustion chamber. By this means the atmospheric air is used in a highly heated state, and the combustion, adds the specification, is much more nearly complete.—*London Artizan.*

THE AMERICAN GAS-LIGHT JOURNAL is published on the 1st and 15th of every month, and is the recognized official organ of

LIGHT, HEAT, WATER-SUPPLY AND SEWERAGE.

Its purpose is to ascertain and make known all new discoveries in the science and economical application of LIGHT, and promote thereby the interests of companies and consumers; to encourage and aid the introduction of PURE WATER from Lakes and Rivers into Towns and Cities, and to improve the system of SEWERAGE, VENTILATION, HEATING, and DRAINAGE everywhere.

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THE

AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

C. ELTON BUCK, ... EDITOR.

MONDAY, FEBRUARY 2, 1863.

The present condition of gas-light companies in all the large towns and cities in the loyal States is a pleasing picture to the shareholders in such corporations. The annual reports of many of these companies have just been made, and with very few exceptions they exhibit a state of affairs in the highest degree encouraging. Notwithstanding the war-tax—notwithstanding the increased cost of coal and labor, and the advanced price of iron-work and almost every substance requisite to keep gas-works in thorough repair—in the face of all these difficulties, the profits which most companies are making are liberal, and their shares as an investment are in greater demand than ever. A year ago very few persons not familiar with the business of gas-light companies would have predicted such a result. To some, their ruin seemed impending, and croakers were not wanting to foretell their approaching worthlessness. In this country as well as abroad, the most gloomy view of the future of the gas-light interest of the United States was taken, but we may safely say this adverse opinion was not shared in by many, and by this time less than a moiety of the croakers are of the same way of thinking. On the contrary, confidence in gas-light securities is fully established, and the capitalist knows that no investment will promise more speedy or certain returns. The large dividends which have just been declared by a number of our gas-light companies have strengthened this confidence, and more inquiries have been lately made with regard to the standing of these companies than within any similar period of our experience.

In many large cities the consumption of gas has greatly increased. The demands of the Government for materials of all kinds necessary to the prosecution of the war have been of so pressing a character, that mills, factories, and foundries have been compelled to double their capacity, and to run at night as well as by day. Of course this increased consumption has had a telling effect upon gas-light companies, and their profits have been augmented in a great ratio. But although this state of affairs has been experienced in most towns of any size—particularly manufacturing towns—yet country companies in certain localities have felt rather a different and more discouraging result. While their expenses have been somewhat increased, their receipts have at the same time been diminished, and owing to the absence of a large number of customers at the war, their consumption has, in a measure, fallen off, and consequently their prosperity has been temporarily eclipsed. We are satisfied, however, that but few companies are in this predicament—the great majority of them are doing a sound and lucrative business, with every hope of increased consumption in the future.

One of the difficulties which country companies have had to compete with—a difficulty which we have frequently alluded to—is the abundance of kerosene oil in the market, and the low price at which it is sold. We have been assured by the officers of country gas-light companies that this is the sole cause of trouble in many places, and that it is really a source of much apprehension. Refined oil—of course some of it of very questionable quality—has been retailed at prices as low as 7 cents a quart, and at this low figure many small consumers are tempted to use it in place of gas. In towns with a population numbering from 2,000 to 5,000 inhabitants, it is very difficult if not impossible to make and sell gas at much less than $3.50 to $4.00 per thousand, and many companies charge much more than this. At this rate it cannot be questioned that small families can obtain light enough for domestic purposes at a lower cost, by using refined coal-oils, than gas-light. Hence the great desire which is felt among country engineers for some new process, by which the cost of production may be so much reduced as to lessen the depressing effect of the competition of the liquid hydrocarbon with the more reliable and safe gas-light.

The question is often put by parties desiring to invest in gas-light shares, whether the capital stock of certain companies may not be "watered" too much. Gas-works are built and fitted up with all the necessary appliances to do a successful business at much less cost than their capital stock represents. This is a fact palpable to all who are acquainted with the business, and yet with this inflation, dividends may be relied upon implicitly unless the "watering" process has been too liberally applied. But we question very much if gas-light companies cannot show a cleaner record in this respect than most other corporations. It would not do to be too inquisitive into the affairs of many of these corporations. Railroad companies, manufacturing companies, and nearly all similar associations are open to quite as much if not more criticism on this score than any other trading corporations. There are some companies we could name the cost of whose works and capital stock bear a very wide disproportion, and where mortgage bonds and other documents preclude any hope of dividends upon the common stock. But we are satisfied that but comparatively few such concerns are in existence, and these are diminishing in number. The end of such companies generally is, that those who are fortunate enough to possess the mortgage indebtedness, usually contrive to play the whole concern into their own hands, after which the works are remunerative enough to satisfy any reasonable expectation. But capitalists accustomed to gas-light securities have their judgment of such stocks somewhat sharpened by experience, and are pretty sure to examine well into the standing of companies before parting with a dollar of their money. This is the true way of ascertaining the value of the shares, and shrewd operators are aware of the necessity of some acquaintance with this value, or else they might make an investment of a permanent though not of a remunerative character—one partaking more of the nature of a sinking fund than a source of revenue.

Upon the whole, then, it may be safely said that no species of securities presents the same attractions to the capitalist as gas-light shares. Look at the stock of the old New York, the Manhattan and the Harlem companies—all of this city. Their shares are seldom offered for sale, but when they are, they bring prices worth having. The Metropolitan company, with the district from Thirty-fourth to Seventy-ninth streets, will soon be in operation—June being named as the probable time—when the same rapid increase will take place in the value of its shares as has already been indicated, and as the shares of the old companies have experienced. These and other gas-light shares—unaffected as they are by commercial revulsions and panics—offer a sure and safe investment to the capitalist, and from indications which have come under our notice they will soon attract the attention of those who have hitherto preferred other securities.

GAS NUISANCE.

To the Editors of the Evening Post:

For months back, at intervals of a few days, the atmosphere of the city is impregnated with the most offensive odors—so offensive, indeed, as to annoy olfactory nerves to a degree almost unbearable. The suffocating stench permeates the dwellings, filling parlors and bedrooms with its disgusting effluvia. Until recently, many people were unable to ascertain the source of this nuisance and patiently bore with it, in the expectation that it proceeded from some drain or cesspool in process of cleansing. But it is now attributed to the consumption of a poor quality of coal used to manufacture the present wretched gas, for which our citizens are paying the most exorbitant rates. This theory of the *source* of the stench may be incorrect, but the *effect* of the bad odor is as stated. As the nuisance shows, or rather diffuses, no atom of abatement, the *Evening Post* is most respectfully requested to investigate causes and insist upon the cessation of an evil which seriously annoys many who wish to read their evening paper without perverted lungs and a foul atmosphere.

Respectfully, PURE AIR.

The above is from the *Evening Post*, a paper particularly sensitive to bad odors—more especially to those resembling the *bouquet d'Afrique*, which stale gas certainly does. Now that he speaks of it, there is a foreign smell about town, noticeable particularly since the Proclamation, and we shouldn't wonder if the gas companies made it; they make everything bad, except bad debts and bad dividends. The *Evening Post* is in the old New York company's district, and this accounts for the bad smell again. Pray, Mr. Adam, do not "pervert" the lungs of the *Post's* readers; it is bad enough to have their stomachs unsettled occasionally by the bad grammar and *pure airs* of its correspondents.

GASEOUS DEVELOPMENTS.—In consequence of the numerous complaints that have recently been made against the New York Gas Companies, it is probable that the Common Council will take the matter in hand and enter into a thorough investigation of the affairs of these monopolies. The manner in which business is transacted is exemplified in the case of a family residing on Murray Hill, who receive gas from the Manhattan Company. From the 18th of October to the 18th of November, their gas bill was $3 50; five burners. From the 18th of November to the 18th of December, their bill was $7. Same burners used and same hours of rising and retirement. No satisfaction resulted from application to the President, Cashier, Clerks or other employees; but not long after, the man employed by the company to inspect the consumer's meter for the purpose of making out bills, became communicative to one of the ladies in the house, and explained (although he ought not to mention it) the fact was that the quality of the gas had been made much poorer lately, and the company were enabled to drive it through the meter with greater pressure than heretofore, and although the light was the same, double the amount of gas was consumed.

The above is taken from a daily paper and is an evidence of the absurdity and frivolity of such complaints against gas companies. It carries its own refutation on its face. The bills for gas necessarily vary from month to month at the same season: a dinner party or an evening entertainment will require several hours consumption of gas for a whole house; a sick baby or two will keep the gas burning all night for a week or two, but when the bill comes in, the cause of the increase is forgotten, and a hue-and-cry of fraud raised against the company.

In speaking of the above extract, a day or two since, a gentleman mentioned that he had repeatedly charged

the Manhattan Gas Company with rendering false bills, and determined to detect them in it, and so he attached one of Kidder's regulators to the pipes, and every Sunday morning took the record of the meter, but to his surprise and chagrin found the company's charge rather within than above his own calculations. This speaks well for the company and for Kidder's regulator; both are good in their way, and they should always go together. Kidder's is the best gas regulator out, and we can put any one with a small capital at command in the way of making a large sum out of this instrument.

ANSWERS TO CORRESPONDENTS.

R. C. A., of Ohio.—*Your letter was received with enclosure. We have as yet had no leisure to make an examination, but will do so as soon as practicable, and inform you of the result.*

J. H. C., of Mass.—*It is, in the opinion of many eminent chemists, not a coal, but asphaltum. A jury of farmers pronounced it coal,*

E. W. S., of Pa.—*Dr. Frankland's second series of experiments are reported in Muspratt's work "Chemistry, Theoretical, Practical, and Analytical, Applied to the Arts and Manufactures." Dr. F. confirmed the views at first assumed by him, and his second experiments were conducted with even greater care than before, in order to detect any error which might have resulted in the first. Dr. Fyfe differed with him very materially.*

C. H. T., of Cal.—*We have forwarded the back numbers to your address by mail.*

F. L., of N. Y.—*We have heard nothing of it. Perhaps you may have been misinformed; for if such is the fact, we should have been advised of it long ago.*

E. P. M., of N. J.—*The third edition of Peckston was published in London, in 1841; it is in some respects superior to any other work on gas, although during the 22 years which have elapsed since its appearance many improvements have been made, which later works describe at some length.*

Illuminating Power of London Gas.—The report of Dr. Letheby during the autumn quarter respecting the illuminating power of the gas made by the Great Central, the Chartered, and the Commercial gas companies of London has been published. From it we learn that the average illuminating power of the Great Central gas was equivalent to 13.34 standard sperm candles. The chartered gas was equal to 13.78 standard candles; and that of the Commercial Gas Company was equal to 13.02 candles. The weekly average of the Great Central had ranged from 12.69 to 14.93 candles; and that of the Commercial from 12.41 to 13.85. The difference in the mean illuminating power of the Great Central gas at the two places where it was tested, viz., Finsbury Square and the London Hospital, which are nearly two miles apart, differed only to the extent of 0.45 of a candle, and as the largest average, 13.55, was at Finsbury Square, it is manifest that the difference was accidental. These results indicate that the gas supplied in the city by the three companies has not during any week been below the standard quality, and that the quarterly averages have been from 8.5 to 0.15 per cent. above it. The former is the excess of the Commercial average, and the latter that of the Chartered. The gas of the Great Central has been 13 per cent. over the standard.

It seems that these London companies try and come as near the standard as possible, taking care not to go much above it. According to their own showing, their gas is 3 to 5 candles poorer in illuminating power than Manhattan gas, or the gas of many other companies in this country.

Hoboken, N. J.—A new gas company has been organized in Hoboken, N. J., under the general manufacturing law of the State. It is stated that among the corporators are the names of E. A. Stevens, G. W. Morton, W. W. Shippen, J. H. Gautier, Mayor Johnson and others. The stock has all been taken, and the work will be commenced without delay. Hoboken is now supplied with gas by the Jersey City Gas Company, who charge $3.00 per thousand cubic feet. It has been intimated that the new company will charge but $2.00 per thousand.

Bridgeport, Ct.—The directors of this gas-light company have determined to pass the usual six months dividend of January, their receipts having been somewhat diluted by the use of coal-oil in their district.

REPORTS OF GAS-LIGHT COMPANIES.

Louisville, Ky.

Office Louisville Gas Company,
Louisville, Ky., December 31st, 1862.

To the Stockholders of the Louisville Gas Company:

Gentlemen,—The suit of the City of Louisville, against this company, which was submitted to the Court of Appeals in December, 1860, has remained there to this time quiescent—no decision; the suit was brought in March, 1860, to restrain the company from paying an extra dividend of ten per cent. in stock, by an increase of the capital stock to the amount of the dividend. This extra dividend was paid in money on the 21st April last. The only other point in the case was to restrain the company from paying off the bonds which she held of the city, (received in payment of the city's subscription for stock in this company) as her profit from her stock in the company accrued. Twenty-three of these bonds—$23,000—had been paid and cancelled. If the opinion of the Chancellor be confirmed by the Court of Appeals, then twenty-three bonds will have to be reinstated, and the $23,000 invested in other funds.

The city has made from her original investment of one hundred thousand dollars, paid in her bonds for the stock in the company, the $23,000 above stated, 2,000 shares of the capital stock, $100,000, and a further sum of $71,165 70, which, under the conditions of the charter, is to be invested "in profitable and safe stocks." (The Chancellor has decided that the city shall indicate to the directors the kind of securities to be purchased.) Of this trust fund, $44,272 70 has been invested; there remains of this fund $27,165 70 to invest, exclusive of the dividend on the stock held by the city to be declared on the first Monday in January next. The points at issue in this suit are entirely immaterial to the interest of this company, however they may be decided by the Court of Appeals.

I know of no subject of more importance to the gas company than the arrangement and management of the retorts, and where skill, properly directed, may tend more directly to promote the interests of the establishment. We have now had clay retorts on trial since August, 1860, and find them superior to iron in every respect. The carbon, which forms in all retorts, and cannot be removed from the iron, gradually decreasing the capacity, and at the same time renders the retort more difficult to heat, may be removed from the clay retort without difficulty; and after such cleaning, the retort is of full capacity and free from carbon.

The cost of the clay retort is less than that of the iron, and if their duration were the same, the former would be the cheapest. When the clay retort is first heated there is a small loss of gas by leakage, but if proper attention be paid to close the small fire-cracks, and the pressure reduced by an exhauster, the loss of gas is inconsiderable. Coal may be carbonized in clay retorts at less expense than in iron retorts, for the above reasons, but principally from their greater durability and the saving of the so frequent expense of resetting. The Killer Belgian Retorts heated in August, 1860, are still in good working order; indeed, these retorts endure longer than the furnaces, which, in our settings, have side ports and nostrils in the crown of the oven. These settings, admirably adapted to iron retorts, which last from nine to seventeen months, are not sufficiently durable for clay retorts, as the side ports burn away before the retorts wear out; in this respect we contemplate a change in our mode of setting. I am under obligations to Joseph A. Sabbaton, Esq., Engineer of the Manhattan Gas-Works, New York, for a tracing of his mode of setting five retorts in an oven, an open setting, with return flues under the two lowest retorts. I have every reason to believe this an excellent setting, equally well adapted to clay retorts, set three or five to an oven. This setting we will adopt in rebuilding six ovens in the northern section of retort house No. 1, which was built in 1848, and now worn out. We will set these five retorts to an oven; all our ovens may be adapted to this mode of setting at a small expense. We have cooled down and reheated Killer's retorts without injury to the retorts.

Our exhausting apparatus has worked efficiently and uninterruptedly since it was placed, in August, 1861.

The repairs of gas-works the past year cost $3,683 38 less than in 1861. The saving may be principally attributed to the introduction of clay retorts, in lieu of iron, as we have had to make no new settings this year. During this year we have purchased 50 dry meters for $533, and have charged to profit and loss $784 50 for 86 meters worn out and destroyed. 1,114 applications for gas have been made; 1,200 meters have been placed; 1,043 meters displaced. There are 155 consumers more than last year; the whole number of consumers is. 3,588 75 new services have been laid; the whole of services is 3,817. 15 street lamps have been placed; the whole number of lamps is 1,218. 1,083 feet of two-inch and 1,174 feet of four-inch pipe have been laid; the extent of street mains is 44 miles 4,971 feet.

The company have not added the United States excise tax to the price of gas. We have returned to the assessor on account of this tax $1,633 38, which sum is to the credit of the United States.

The whole quantity of gas made this year, as recorded by station meters is 60,586,250 cubic feet; this is 7,285,950 more than was made last year. The greatest consumption of gas in any one day this year was on the 24th of December—301,400 cubic feet. The quantity of gas mads in 23 years is 640,524,340 cubic feet. 14,591,600 pounds of coal have been carbonized, yielding 4,152 cubic feet to each pound of coal of high illuminating power.

Referring you to the detailed report of the Cashier,
I remain yours respectfully,
Robt. G. Courtenay, President.

Product, Receipts, and Expenditures, in the Manufacture and Sale of Gas by the Louisville Gas Company, from the 31st Dec., 1861, to the 31st Dec., 1862.

	Cubic Feet.	
Gas sold by meter	40,684,000	
Gas consumed in street lamps and loss by leakage, &c., &c.	19,902,250	
Total product of gas	60,586,250	
Receipts.		
Gas sold by meter and street lamps		$128,537 81
Sales of coke		4,856 07
Sales of coal tar		158 50
Meter rent		1,336 75
		$134,889 13
Expenditures.		
Coal carbonized and used in offices and shop, 15,432,176 lbs	$18,797 96	
Lime used in purification, 3,992 bushels	864 42	
Labor, cleaning, lighting and repairing street lamps	4,229 18	
Meter fluid and whiskey for meters	3,420 68	
Workmen's wages	15,094 73	
Office expenses	5,073 86	
Repairs of gas-works, and mains, meters, &c.	2,942 17	
City taxes, 1862	$1,369 02	
State do. do.	232 20	
United States excise tax	1,633 38	
	3,234 60	
		53,657 60
Net product		$81,231 53

Street mains laid to 31st Dec., 1862.

2 inch.	3 inch.	4 inch.	6 inch.	10 inch.	12 inch.
64,899 ft.	35,525 ft.	121,860 ft.	2,950 ft.	852 ft.	3,536 ft.

Additions to Gas-Works in 1862.		
Gas-works proper	$39 61	
Street mains	589 82	
Services	534 82	
Street lamps	206 67	
Meters	533 00	
		1,903 92
Less worn out meters		784 50
		$1,119 42

Division of Gas-Works.	
Gas-works proper	$202,738 65
Street mains	182,484 19
Services	29,298 01
Street lamps	81,117 27
Meters	36,816 02
Real estate for works, office and shop	49,666 03
Total cost	$581,620 17
Capital stock	$481,400 00
The cost of the works exceed the capital	50,220 17
	$581,620 17

Profit and Loss.

1862.			
January 6.	By balance from old account		$49,476 60
July 1.	" Gas 6 months		48,368 21
	" Rent of real estate 6 months		191 71
	" Meter rent	do	397 25
	" Coke	do	1,729 39
	" Tar	do	48 35
	" 6 months interest on $77,000 city bonds		2,310 00

		Contra.			
July	1.	To Counterfeit money		5 00	
		" Gas Bills		4 99	
		" Worn out meters		784 50	
		" Expense		2,564 65	
		" Repairs in gas-works		1,629 94	
	8.	" Dividend 6 per ct. on $481,400		28,884	
		" Balance to new account		68,588 43	
				$102,461 51	$102,461 51
1862.					
July	8.	By balance from old account			$68,588 43
Dec.	31.	" Gas 6 months			34,558 39
		" Rent of real estate 6 months			97 25
		" Meter rent do			938 50
		" Coke do			3,126 68
		" Tar do			110 15
		" Interest on $77,000 city bonds 6 months.			2,310 00
		Contra.			
Dec.	31.	To Expense		$2,509 21	
		" Repairs on gas-works		1,312 23	
1863.		" Gas-fittings		150 00	
January	5.	" Dividend 6 per ct. on $481,400		28,884 00	
		" Balance to new account		76,873 96	
1863.				$109,729 40	$109,729 40
January	5.	By balance from old account			$76,873 96

BALANCE SHEET OF THE LOUISVILLE GAS CO., January 1st, 1863.

By Capital Stock held by city	$200,000 00		
" do do in trust for city	5,250 00		
" do do held by individuals	276,150 00	$481,400 00	
" Contingent fund to cover depreciation. (70,000 00)		70,000 00	
" Profit and loss including Jan. dividend.		105,757 96	
" Dividend accts. Nos., 44, 41, 42, 43, 45, 46 & 2 extra		651 00	
" Lamp-lighters		110 00	
" City of Louisville interest and dividend account		69,128 40	
" United States excise tax		1,633 38	
Contra.			
To Louisville City bonds held by company	$77,000 00		
" Stock in Louisville and Frankfort R. R.	3,645 30		
" Stock in Louisville and Nashville R. R.	1,170 04		
" Cash	19,133 82		
" City warrants	24,110 83		
" Louisville gas-works and real estate	531,620 17		
" Gas-fitting	2,519 52		
" Unpaid gas-fitting bills	184 25		
" Unpaid gas bills due 1-4 January	21,850 53		
" Unpaid coke bills	357 46		
" Coal	1,296 04		
" Lime	135 85		
" City Louisville fund in trust	44,272 70		
" Retort account, Belgian retorts on hand	774 46		
" Cast iron lamps	79 43		
" Gas bills	530 34		
	$728,680 74	$728,680 74	

LOUISVILLE, KY., January 6th, 1863

JOHN S. CAIN, Cashier.

DIRECTORS FOR 1863.

R. G. COURTENAY, Pres't.,
Dr. R. C. HEWITT,
JAMES W. HENNING,
GEO. W. MERIWETHER,
T. T. SHREVE,
A. VATTLE,
} Six Directors on the part of the Stockholders.

E. BUSTARD,
PAUL DANELLI,
Dr. LEWIS ROGERS.
} Three Directors on the part of the City.

CARBURATION OF GAS IN LONDON.—Dr. Letheby has drawn the following specification for the quality of naphtha to be supplied to the carburators of the city lamps (nearly 2,000 in number). The particulars of the specification have been arrived at by a long series of experiments with naphtha of different specific gravities and boiling points. The naphtha must be colorless, and of a gravity not less than 830 nor greater than 860. When placed in a distillation apparatus in a bath of oil, and having a thermometer placed in the naphtha, it must begin to distil at a temperature not higher than 110° C. (230° F.) and must yield 70 per cent. of volatile naphtha at from 110° C. to 130° C. (266° F.) and 20 per cent. between 130° C. and 150° C. (302 F.) This is expected to leave but little residuum, and to give continuously 8 grains of hydrocarbon to each cubic foot of gas, and thus raise the illuminating power of the gas about 60 per cent. over that unnaphthalized.

MR. E. B. SHEARS ON PETROLEUM-GAS.

Mr. E. B. Shears, of Clifton, C. W., has forwarded a printed circular and a description in manuscript relating to his process for making illuminating gas from petroleum, for publication in this Journal. As the printed circular is not merely a very lengthy advertisement of his business, but contains besides a number of statements which appear to be contrary to fact, we refrain from giving it insertion. If Mr. Shears had not intimated to us in a letter which accompanies the printed circular that he has already distributed that document we should have refrained from making any allusion to the discrepancies which it embodies. With reference to the manuscript portion of Mr. Shears' communication we shall omit those portions which narrate the history of what Mr. Shears calls his "discoveries," being contented to refer him to the AMERICAN GAS-LIGHT JOURNAL for the details of his process published early in the present year, and to the patent which was taken out by parties in Philadelphia for an apparatus designed to accomplish the "discoveries" claimed by Mr. Shears, some months before he states "he conceived the idea." Mr. Shears may have made his "discovery" independently of the AMERICAN GAS-LIGHT JOURNAL or of the Philadelphia patentees; but it is reasonable to suppose that one who attaches to his name the designation "Gas Engineer" would peruse the only publication devoted to gas illumination issued in the United States, and before he takes out a patent would endeavor to see that he has not been anticipated. Mr. Shears errs also in the statement he makes with reference to other patents for the manufacture of illuminating gas from Petroleum, and before he gives a more extended circulation to his "circular" it would be well for him to examine with more care than he seems to have bestowed, the claims of other parties in the same field.

Mr. Shears says: "Last spring I found that by mixing about 30 per cent. of atmospheric air with the gas, I produced a gas that would burn in large burners without smoking, giving a flame equal in size to that of coal-gas without injuring the brilliancy of the light." * * * * "Considering the discovery of so much importance, I procured a patent for it, also for a process of mixing the air with the gas in a thorough manner, which is done *by inserting a pipe connected with an air-press or pump into the main gas-pipe leading from the works to the gas-holder*, by which means I mix the air with the gas as it is made and is passing through the pipe. Upon the air-pipe I put a guage cock to regulate the flow of air, that the mixture may be in proper proportions. While passing through the pipes together they become thoroughly mixed. By which means I produce between four and five thousand feet of gas from a barrel of crude oil."

We do not in the least degree discredit the fact that the mixture of 30 per cent. of air with petroleum-gas will give a large flame free from smoke; the air acting as a diluent, and, containing oxygen, ensures the entire combustion of the carbon of the gas, and will enable large burners to be used with gas of comparatively less illuminating power. In fact, petroleum-gas, when mixed with different and increasing quantities of air, can be made of any candle power the operator wishes, within limits which are now well known, and if Mr. Shears was in possession of a *safe* process for effecting the combustion of petroleum-gas, diluted with air, we should have nothing further to say on the subject but to wish him success. It is, however, our duty to point out the danger of Mr. Shears' process. According to his description he furnishes his patrons with a large quantity of most dangerously explosive mixture, within or close to the limits of their dwellings. A gas-holder, holding 1,000 cubic feet and containing 30 per cent. of air, would possess explosive power sufficient to blow up any of the buildings into which Mr. Shears alleges he has introduced his gas. One of the properties which all illuminating gas in common use possesses is, that it contains little or no free oxygen, hence flame will not travel down a pipe filled with such gas; but when oxygen is introduced with the 30 per cent. of air Mr. Shears mixes with it before it reaches the holder, flame may travel down through the service pipes and mains, force back, by the expansion caused by heat, the seals which are usually introduced, and reach the explosive mixture in the holder—the result, it is needless to say, would be frightful, and might be attended with serious loss of life. It is ridiculous to suppose that insurance companies would have anything to do with a building which contained so near it the elements of its own destruction as Mr. Shears, innocently, no doubt, places within or near them. That air can be advantageously mixed with petroleum-gas we think probable, and that it can be done with perfect safety we are equally satisfied, but it must not be mixed in the gas-holder—it must be a subsequent operation, so that all danger of explosion is avoided. We consider it a public duty to point out the imminent source of danger which arises whenever air is mixed with gas in the holder, because we find the idea prevalent that the mixture is advantageous and harmless. In justice to Mr. Shears we may state that he has received testimonials from the proprietors of the Clifton House, Niagara Falls, the Monteagle House, Suspension Bridge, and others, speaking favorably of the economy of his process; but at the same time we must remind those who are innocently enjoying the result of his mixture of air and gas in the gas-holder, that they are like men living above a volcano, which may some day unexpectedly astonish them with an explosion, from the effects of which escape will be nothing less than providential. — *Journal of Board of Arts for Upper Canada.*

[If Mr. Shears will examine the records of the British Patent Office, he will find that in July, 1842, James Crutchell took out a patent for "*Improvements in manufacturing gas, and an apparatus for consuming gas.*" This invention consisted in "the admixture of atmospheric air, or other supporter of combustion, in any required proportions, with coal-gas or other illuminating gas, previously to its issuing from the burner." This arrangement was much superior to that proposed by Mr. Shears, because the gas was mixed with the air *after* it left the gas-holder, and the mechanism controlling the admission of the air was regulated by the motion of the meter, so that the amount of air used was always exactly known.—ED. AM. GAS-LT. JOUR.]

DANGER OF EXPLOSION OF GAS-HOLDERS.

At a recent fire in London, at Sir Charles Price's oil stores, which are situated near the City of London Gas Company's gas-holders, much fear was entertained lest the flames should cause an explosion of the same. The newspaper accounts of this fire dwelt on the imaginary danger, and advanced the idea that the heat would collapse the holder, and by causing an intermixture of air and gas would form an explosive compound, and thus bring about the catastrophe so much dreaded. A writer in a London exchange thus attempts to show the little danger to be apprehended from fires in the vicinity of gas-holders:

"It is generally known that gas requires a large admixture of atmospheric air or oxygen, to cause it to ignite or explode; and that, so long as the water-lute is well secured, no danger can possibly occur of air entering or explosion taking place.

"I may here observe that I was once witness to a fire where the flame impinged directly upon a holder charged with gas, which was nearly full, and in a short time became quite so, by the expansion of its contents. The flame continued; the gas escaped by bubbles through the water-lute, and ignited in detached flames. This continued for some time, when the fire was subdued; and, although afterwards that part of the holder that had been in immediate contact with the flames had the appearance of having been red-hot, except the loss of gas, and a little alarm, no harm was done. This fact will convince any one that an explosion of a holder charged with gas under *ordinary* circumstances is impossible.

"I have no wish to alarm, or attach any undue importance to the subject, but think we should not content ourselves with the knowledge of the results of ordinary events, but should strive to acquire information concerning the most extraordinary and unfavorable that can arise, and thus provide against their evils.

"For this purpose, I will suppose a holder fully charged to be subjected to the action of flame on several sides; and I will venture to indicate a possibility of danger as also a certainty of preventing it.

"If, as before stated, the holder were to be so sur-

rounded by flames, the consequence would be an emission of a considerable portion of the gas confined therein; and the remainder, becoming of a lighter specific gravity, would have a tendency to, and would ultimately, raise the holder and unseal the water-lute, so that air would thus intermingle with the gas. The result cannot be conjectured; and it is a difficulty that can be easily guarded against.

"The remedy for this evil is simple, and consists merely in placing stops or catches at the proper height, so that the holder cannot rise out of the water and become uncealed; this being done, I am convinced that no explosion of a gas-holder could occur."

Although the gas-holders that we have seen are seldom erected in close proximity to buildings, yet in some locations they may be exposed to danger from fire. Forewarned is being forearmed, and we commend the foregoing remarks to those engineers who have reason to apprehend such casualties.

PATENTS.

UNITED STATES.

37,267.—J. S. Atterbury and T. B. Atterbury, Pittsburgh, Pa., for a Kerosene Lamp:

We claim, as a new article of manufacture, a glass collar, C, constructed and applied to a lamp in the manner and for the purpose substantially as set forth.

37,270.—L. F. Betts, Albion, Mich., for a Chimney Cap:

I claim the peculiar arrangement of the two flues, B B, in combination with the openings or inlet passages, X X, "guide plate," D, and cowls, E E, substantially in the manner and for the purposes specified.

37,276.—J. H. Connelly, Wheeling, Va., for a Lamp Wick:

I claim, first, Making a hollow wick for lamps of a folded strip of muslin or other textile fabric, by uniting the edges of the strip by means of a paste of cement, insoluble in the oil or burning fluid which is to be burned by the wick.

Seond, Inserting in an internally-wrapped hollow or tubular lamp wick, a strip or strips of porous paper, or raw cotton wrapped in paper so as to give to the wick the required stiffness and shape, while increasing its capillary power.

Third, Making hollow or tubular lamp wicks of muslin, linen, or other suitable textile fabric without nap, and filled with porous paper, paper pulp, raw cotton or other substance possessing the requisite capillaly property, substantially in the manner hereinbe fore described.

37,281.—M. B. Dyott, Philadelphia, Pa., for a Coal-oil Burner:

I claim a lamp burner constructed of two parts, A D, connected together by slotted spiral arms, G, and pins, d, arranged substantially as shown and described, to admit of the raising and lowering of the part, D, cone, E, and chimney, for the purpose set forth.

37,289.—W. H. Gwynn, White Plains, N. Y., for an Improvement in the Manufacture of Illuminating Gas:

I claim obtaining illuminating gas from coal and wood, placed together in a retort in manner and proportnios and treated substantially as described.

37,301.—S. G. Morrison, Williamsport, Pa., for a Lamp:

I claim the distributing tube, B, with the composite wicks, C C C, and flame wick, d d, in connection with the conducting wick, A a, so as to lessen the amount of oil raised by capillary attraction to the flame, the amount of wick exposed to the oil reservoir being about one-third of that supplying the flame, the whole constructed and operating substantially as specified.

37,316.—John Zengeler, Chicago, Ill., for a Chimney Attachment for Lamps:

I claim the combination of the friction roller, e, with the pivoted arm, b, spring clamp, B, and curved spring, H, all constructed, arranged and employed in connection with the lamp top, A, in the manner and for the purposes herein shown and explained.

37,337.—Elias Dohner, Lancaster, Pa., and A. M. Bruckart, Brunnersville, Pa., for a Water Wheel:

I claim the combination of the short intermediate baskets, D, with the buckets, C, hub, A, and rim, B, all coustructed and arranged in the manner and for the objects set forth.

37,344.—Abraham Huffer, Hagerstown, Md., for a Combination of Steam and Water Power:

I claim the combination of a steam generator or steam generators with a water wheel or water wheels, and chambers or a chamber for elevating water by atmosphere pressure, and driving a water wheel or wheels, substantially in the manner and for the purpose set forth.

37,349.—Almon Leach, Utica, N. Y., for a Coal-oil Lamp:

I claim securing the cylinder, H, performing plate, J, and flange, K, to the burner, G, as shown, when said burner is screwed into the tube, B, and all used in connection with the cylinder or jacket, D, for the purpose herein set forth.

I further claim the combination of two reflectors, L L, formed each of concave and convex surfaces, h i, constructed together angularly with each other and placed in relation with the flame of the lamp, as herein specified.

37,355.—J. M. Miller, Hamilton, Ohio, for a Water Wheel:

First, In combination with the pulleys, A and B, I claim an endless chain of buckets, C, constructed as described, with overlapping wings, F, to prevent the waste or water, the whole operating in the manner and for the purpose set forth.

Second, I claim connecting the said buckets, C, by gudgeons, D', fitting in eyes, D, the said parts being located directly over the center of the buckets when full, and in other respects so arranged that each bucket shall be suspended in a perpendicular position, as explained.

37,366.—H. H. Swift, Hart's Village, N. Y., for Mode of Attaching Chimneys to Lamps:

I claim the spring, E, bent or curved in bow form, and applied to the burner, A, substantially as and for the purpose herein set forth.

37,375.—J. E. Sturdy (assignor to himself and C. A. Smith), Augusta, Maine, for a Water Elevator:

First, I claim the attaching of the spout, I, to the bucket, D, substantially as shown, in combination with a lever, H, and valve, G, all arranged in the manner shown, so that said spout may be tilted at the proper time, and the valve raised in order to admit of the water being discharged from the bucket, as described.

Second, The cam, N, and lips, h h, attached to the bucket, D, in combination with the pendent plate, O, attached to the rising and falling bar, L, arranged to operate as and for the purpose specified.

37,377.—Benjamin Rhodes, Old Ford Road, Bow, England, (assignor to James McGeary, Salem, Mass.,) for an Apparatus for the Manufacture of Tubes, Pipes, &c. Patented in England, April 19, 1862:

I claim, first, The general construction and arrangement of parts of the machinery or apparatus herein described and as shown in the accompanying drawings, for the purposes set forth.

Second, The use or employment of a perforated cylinder or roller, or a cylinder composed of wire gauze covering revolving in a bath of bitumen, or its equivalent, for the purpose of insuring the more thorough saturation and coating of the material employed for forming pipes.

Third, The use or employment of cold water circulating through the top pressure roller and the cooling and polishing cylinder of pipe making machines.

37,378.—Norman Allen, of West Meriden, Conn., for a Lamp-lighting Device:

I claim the combination of the chamber or recepticle A, tube, B, and wick, C, all arranged substantially as shown and described to form a new and improved article for the purpose specified.

37,383.—F. S. Burt, of Mount Pleasant, Iowa, for a Pump:

I claim the combination of the piston, D, and the slide valve, H, working in separate compartments, E G, in the pump chamber, A, in connection with the tube, B, and the water passage, I, in the side and top of the chamber, A, and the induction openings, g g g g, in the side of the said chamber, all being constructed and arranged as and for the purpose herein set forth.

37,394.—Minor H. Fowler, of New York City, for a Lantern for Burning Coal-Oil:

I claim, first, The perforations, b, in the flange or base, a, of the part, A, of the lantern, when used in connection with perforations, h, in the base, e, of the lamp, E, or with other suitable air spaces in the bottom of the lantern and with or without the perforations, d, in the rim, c, as and for the purpose herein set forth.

Second, Constructing the base, e, of the lamp, B, with ledges or bearings, f, substantially as shown and described, in connection with the rim, c, or other equivalent bearing attached to the part, A, for the purpose of admitting air spaces, g, around the base, e, as set forth.

Third, The combination of the perforations, b, in the flange or base, a, of the part, A, of the lantern; the perforations, h, in the base, e, of the lamp; the air spaces, g, found by the ledges or bearings, f, on the base, e, and the rim, c, or its equivalent—all arranged as and for the purpose herein set forth.

37,395.—Henry Getty, of Brooklyn, N. Y., for Pipe Tongs:

I claim, first, The hook-jaw constructed as shown in combination with a stationary serrated cam lever, for the purpose specified.

Second, In combination with the same, I claim the finger-rest, D, for the purpose set forth.

37,404.—Theophilus Mayhew, of Poughkeepsie, N. Y., for a Feeder for Lamps:

I claim the screw thimble, formed by the sockets, c and d, applied between the burner, and the collar on the lamp in the manner specified, whereby said burner and lamp are connected, but the lamp burner can be raised for filling the reservoir without unscrewing the burner as specified.

37,412.—W. G. Valentin, Oxford street, London, England, for Coking Coal and Generating Gases. Patented in England, Feb. 13, 1862:

I claim coking coal in close chambers or retorts heated externally by the combustion of gases generated from similar previous coking operations and applied in the manner herein set forth.

I also claim the use of the vertical close chambers or retorts, a, in combination with the external flues or heating channels supplied with combustible gases and air from the burners, f.

I claim the use and application of the combination of parts whether for coking coal or generating combustible gases for heating and lighting purposes.

37,425.—R. C. Robbins, of Jersey, N. J., for a Gas-pipe Joint:

I claim the method of forming the packing by means of casting lead or other suitable material in a circular groove in the mouth socket of a pipe, and into which the tapering end of the succeeding pipe is intended to be forced in the manner and for the purpose substantially as set forth.

RE-ISSUES.

1,373—W. O. B. Merrill, Philadelphia, Pa., for a Coal-oil Lamp. Patented June 10, 1862:

I claim two inclined or curved plates, d and d', of a length greater than the width of the wick tube, the said plates being disconnected from each other at the opposite ends, and being otherwise arranged in respect to the wick tube and wick, essentially as and for the purpose herein set forth.

1,374.—W. H. Racey (assignee through mesne assignments of Max Miller), New York City, for a Lantern for Coal-oil. Patented August 17, 1858:

I claim the combination with the cylinder or protector, C, of the inverted cup, H, or its equivalent device, substantially as and for the purpose herein shown and described.

The combination with the protector or cylinder, C, of the tube, G, substantially in the manner and for the purpose herein shown and described.

1,375.—George Stevenson (assignee of J. E. Boyle), New York City, for a Valve for Water Closets. Patented January 3, 1860:

I claim the valve and its appendages, or the equivalent of them, whose mode of operations is to close the water ways by the pressure of the supply water only, substantially as described, in combination with the means herein described, or the equivalent thereof, for governing the closing of the valve, so that the water shall flow through to wash the pan before the water ways are closed, substantially as described.

DESIGN.

1,704.—G. B. Halstead, of New York City, for a Design for the Air Jacket of a Lamp.

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THE COMMITTE ON SEWERS OF the Board of Aldermen will meet every WEDNESDAY, at 3 o'clock P. M., in Room No. 8 City Hall. Parties interested in any matter before the Committee will have an opportunity of being heard.

T. FARLEY,
IRA A. ALLEN,
G. A. JEREMIAH,
Committee on Sewers.

OFFICE OF THE CITIZENS' GAS-LIGHT COMPANY OF BROOKLYN, No. 1 POST-OFFICE BUILDING, MONTAGUE ST., BROOKLYN, Dec. 29, 1862.—THIRD DIVIDEND.—A dividend of THREE PER CENT. on the capital stock of this Company has been declared, payable on and after the 15th of January. The Transfer Books will be closed from the 1st to the 15th of January inclusive. By order,
H. WARREN, Secretary.

OFFICE WILLIAMSBURGH GAS-Light Company, Brooklyn, N. Y., January 12th, 1863.—DIVIDEND.—The Board of Directors have this day declared a semi-annual DIVIDEND of FIVE PER CENT., payable on and after Monday next, January 19th.

The Transfer books will remain closed until the 20th. C. F. BLODGET, Secretary.

JERSEY CITY WATER LOAN Bonds.—Notice is hereby given that the Interest Coupons, due January 1, 1863, of the Jersey City Water Loan Bonds, will be paid upon presentation at the Ocean Bank, New York city, and the Bank of Jersey City, Jersey City, N. J.
G. S. BOICE, Registrar.
OFFICE OF THE WATER COMMISSIONERS, Jersey City, Dec. 20, 1862.

NEW BOOKS.

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A Treatise on Gas-Works and the Practice of Manufacturing and Distributing Coal-Gas. By Samuel Hughes, Civil Engineer.

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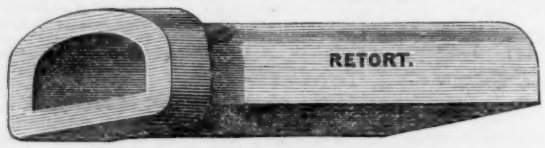

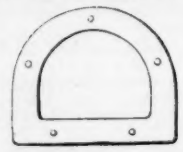

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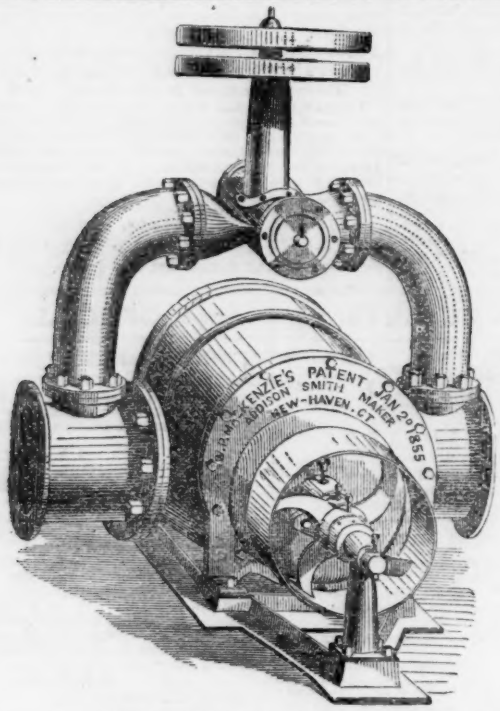

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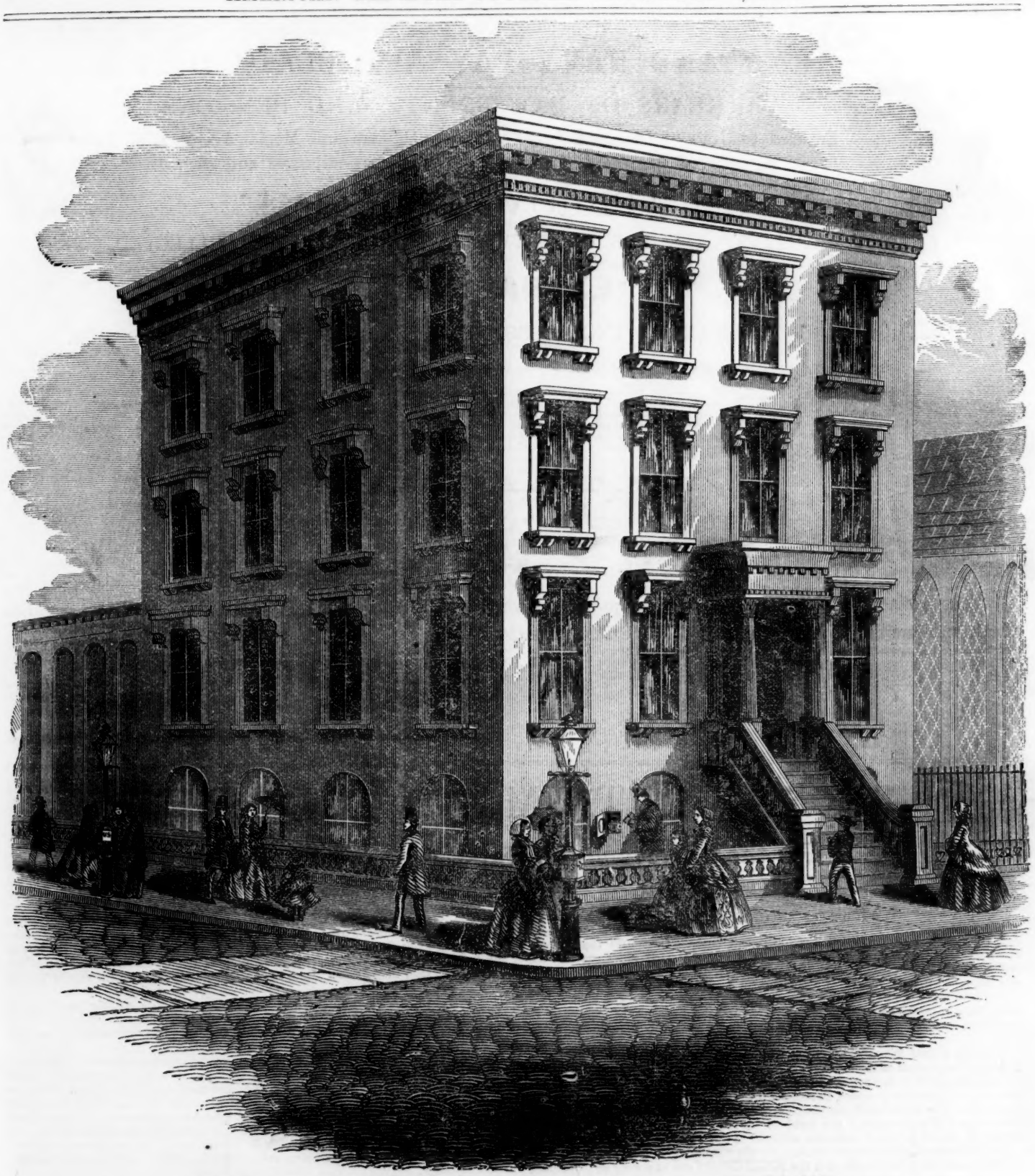

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Iron pipes are at present frequently covered with a coating of bitumen or coal tar before they are laid down; but the adherence of this coating to the metal being very imperfect, on account of vibration and the difference of expansion, this preservation is insufficient, besides being exposed to a number of influences which neutralize its efficacy—galvanic currents materially assist the formation of oxides and deposits, which cause the obstruction and eventually the destruction of metallic pipes.

The Patent Bituminized Pipes are neutral, non-conductors of electricity, and consequently are not exposed to any of the deteriorating influences mentioned above. The process of manufacture of these Pipes consist in causing a roll of paper to pass through a reservoir of melted bitumen, after which it is tightly coiled around a mandril to any required thickness; and thus, when hardened, a tube is formed of perfect texture, great hardness, and enormous strength. These Pipes are proved, by hydraulic pressure, to resist a pressure of 220 lbs. to the square inch, equal to 506 feet head of water, which is more than double the altitude of the highest reservoir. The bituminous composition which unites and covers these Pipes is so well known as an excellent preservative, that it will be unnecessary to demonstrate that, when laid underground, the durability of the Patent Bituminized Pipes may be considered as unlimited. The Pipes are made in lengths of seven feet, and are connected by socket joints of the same material as the Pipes; or they can be fitted with iron flanged sockets, screwed together in a most simple and inexpensive manner.

For Gas these Pipes are invaluable; the Gas-lining which we insert effectualy resists the action of Gas, and being non-conductors, there can be no condensation in them, and the joints made with the Patent Cement are so strong as to entirely prevent Leakage.

The cost of laying the Pipe is also small, compared with those of iron, and can be done by mere laborers. The Bituminized Pipes have been in use the last three years, for the conveyance of gas and have been ascertained to be as perfect now as when first laid down.

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Pack the pipes level in the ordinary way; slip the collar over one of the pipes; draw the ends close together and warm them by putting a hot iron between them; then press them together so as to make them adhere; take a piece of iron wire netting, about half an inch in the mesh, a little narrower than the length of the collar, and long enough to wrap once round the pipe, spread the collar over it and the joining; close the ends with clay; pour the melted cement into the manhole of the collar, and fill up the interior space; then remove the clay and the joint is finished.

It is necessary to leave a small vent hole in the clay at each end of the collar to allow the air to escape as the cement is poured in, that there may be no flaws or air bubles in it when cold. If in cooling the cement settles in the manhole, fill up again.

N. B.—The cement should be broken into small pieces and melted in a pot as you do lead, at a low temperature, until it is dissolved; it must be stirred while melting; then take it off and keep stiring it as it cools until it becomes nearly as liquid as water; then pour quickly.

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These SIGNAL LIGHTS are intended for use on Vessels propelled by Steam, and those exclusively. They specially indicate the presence of a Steamer, and by their use there will be less likelihood of mistakes, and consequent collision, than at present. They are also intended for SIGNALLING AT NIGHT, and can be used for that purpose UNDER ANY CODE of SIGNALS NOW ARRANGED FOR FLAGS.

This Improvement in Lights for Steam Vessels consists in having the Lanterns containing the colored lights connected by means of a series of cogged gearing with some convenient part of the Engine or Machinery, so as to cause them to have a revolving motion around their axis. On side-wheel steamers, the Lanterns should be placed directly over the wheel-houses, and the power, or motion to turn them, may then be very conveniently obtained from the paddle-wheel shaft. On Propellers, the Lanterns should be placed on each side of the Pilot House, or hurricane deck, and the rotary motion derived from any convenient or suitable part of the Engine or Propeller shaft. Each Lantern is supported on the end of movable cranes, so that their relative positions may be changed and properly adjusted to suit the view of observers on either side of the vessel at the time of signalling.

The Lanterns to be used in this improvement may be constructed for Burning Oils, Fluids, Gas, or any of the known modes of illumination, and should be furnished with one or more lenses and reflectors, so as to concentrate the rays of light, and project them over the horizon with the greatest intensity. The lenses for this purpose should be made with colored glass, viz., Red and Green, and the position of the respective Lanterns, according to the color of the lenses therein, must be placed on the sides of the vessel so as to answer to the requirements of Rules and Regulations made and published by the Supervising Inspectors of Steamboats, agreeably to the Act of Congress of the United States in such cases made and provided. That is to say—by said Regulation—the Lantern having the green lenses for producing the Green Colored Light, must be placed on the starboard side of the vessel, and the other Lantern producing the Red Light, to be placed on the port side thereof. In pursuance, also, of the aforesaid Rules and Regulations, there is to be found in board and behind each Lantern, a screen to answer the purposes therein mentioned.

The cogged gearing, by which the Lanterns are connected with the Engine or paddle-wheel shaft, and thereby caused to revolve when the Engine is in motion, is so arranged that the connection may be readily shipped or unshipped, and the Lanterns made stationary or otherwise, at the pleasure of the Pilot, or those whose duty it may be to operate and attend to the same. The cranes on which the Lanterns are placed are also rigged so as to be readily turned horizontally from one position to another, so as to present one or both lights to the view of observers when laying athwart ships at the time of signalling.

On the Use and Application of the Improvement for Night Signals.

When the vessel is under weigh, or going ahead in its course, the Lanterns are to be placed directly athwart ships, so that such colored light therein will then have the position and place prescribed by Rule Seventh of the aforesaid Supervising Inspectors of Steam Boats, and with the screens behind them, as above described, will then answer all the intents and purposes for which the colored lights are thus required to be used, as illustrated in the several diagrams published by said Inspectors for the working of a system of Colored Lights. The Lights in this case, according to the color seen by the observer, indicate the course or direction of the vessel whereon they are carried. When the Lanterns with the colored lights therein, are made to revolve around on their axis, as proposed in this improvement, in addition to the signal above, another, and as we believe, very important and useful signal is thus formed, indicating that the vessel, whereon it is carried is a Steamer. In dark foggy nights, it is found by experience, to be somewhat of a difficult task to distinguish sailing vessels from Steamers and Propellers, especially when the latter are rigged, and carry a press of sail. When Steamers meet "head and head," it is the duty of each to pass to the right, or, on the larboard side of the other. Whereas, when a Steamer meets a sailing vessel, the former must give way and allow the latter to pursue its course. Hence, to carry out the regulations of the said Steamboat Inspectors, and prevent collisions, it is important to have some infallible sign, whereby the character of the vessel may be readily seen and determined. Several very fatal collisions have recently taken place through mistakes of this kind.

On Signals for Speed and Distance.

The gearing of the Lanterns with the paddle wheel or propeller shaft, may be so arranged as to be an index of their speed. A very good proportion, would probably be to make the Laterns turn about one-third as fast as said shaft. Hence, when the speed of the vessel is previously known, when making a certain number of revolutions of the paddle or propeller, it becomes an easy task from observing the time with which the Lanterns thereon may be turning to approximate to the speed with which the said vessel is moving at the time of observation. Again, as the arcs described by the rays of light from each lantern, as they revolve around on their axis, is greater in proportion to the distance from said lantern, so will the time in which said rays move over any given space, be less in the same proportion. Hence, when the lights are very remote, or far off, from the observer, the duration of each column or cylinder, of rays from each lense, would pass the eye of the observer, in a short space of time, or with great velocity. Whereas, at a nearer point of observation, the time of its passage would be considerably lengthened, or the motion thereof apparently much slower. From these facts, we believe the improvement is susceptible of indicating, in an approximate manner, the speed and distance of vessels whereon the revolving lights may be used.

On the Application of the Improvement for Marine Telegraphic Purposes.

The Revolving Lights can be readily applied to the general purposes of Marine Signalling at night, as follows: In order to show this application, we have adopted the Numbers as given in Roger's Code of Marine Day Signals, believing that work to be somewhat of a standard in matters of this kind. Instead of the flags used in the above code, for day signals, to indicate the combinations of two or more letters of the Alphabet, which combination is referable to certain numbers indicative of the words or sentences telegraphed, we propose to perform the same operation, at night, by means of the two revolving colored lights, so as to indicate the numbers directly to which the intended words or sentences to be telegraphed are referable. Thus, whether the vessel to be signalled is ahead, astern, or abaft the beam, the position of the two colored lights must be so adjusted, by means of the moveable cranes, whereon said lanterns or lights are fixed, that the two lights may be fully made visible to the observer. When both lights are thrown into this position, stopping the motion of the lanterns may be the signal for calling attention, or a rocket fired off, or the steam whistle blown, would answer the same purpose. Now, in order to represent the ten numerals, we propose to indicate them by the respective motions of the two colored lights, as follows:

RED LIGHT.	GREEN LIGHT.
One Red, Represents Number 1.	Two Green, Represents Number 2.
Three do. do. do. 3.	Four do. do. do. 4.
Five do. do. do. 5.	Six do. do do. 6.
Seven do. do. do. 7.	Eight do. do. do. 8.
Nine do. do. do. 9.	One do. do. do. 0.

In the above arrangement, it will be seen that all the odd numbers are made by the Red Light, and the even numbers by the Green Light. In order to indicate the repeat of the last number, once or more times, or for other special purposes, which may hereafter be found useful and necessary, an even number of lights may be shown by the Red, and an odd number by the Green. It will be understood that when the Lanterns are made with three lenses in them, the numerals as above arranged are formed by the number of times a new light or lense is presented to the observer. Thus to indicate the number 3, the Red Light or Lantern would make one entire revolution; and to make the number 6, the Lantern carrying the Green Light would make two revolutions, and so on with the other numbers. When a symbol is made, the motion of the Lantern is to be suspended for a short time, and when a number expressing a sentence is formed, the lantern may be stopped for a longer period, or some one of the special signals above referred to, may be used for this purpose.

To show the application of this improvement as above mentioned, whereby these Lights can be used as readily for Night Signals, as Flags are used for Day Signals by the author of Roger's Code, we shall use the sign O, colored red or green, according to the light used, to show the number of movements performed by the respective lights in order to represent any desired number of said code, suitable for the required purpose.

RED LIGHT.	GREEN LIGHT.
O, O, O, O, O,	
O, O, O, O, O, O, O.	
	O, O.
	O, O.

The above would represent the number 5722, and by reference to said Roger's Code, would be found to stand before the sentence:

"Will you show the Number that represents your Name?"

RED LIGHT.	GREEN LIGHT.
O.	
O, O, O, O, O.	
O, O, O, O, O, O, O.	
	O, O.

Here the number expressed is 1572, and per the same Code, stands for

"Where are you Bound?"

RED LIGHT.	GREEN LIGHT.
O.	
O, O, O, O, O, O, O, O, O.	
	O, O.
O, O, O, O, O, O, O, O, O.	

The number thus expressed is 1928, and per said Code is

"What is your Cargo?"

RED LIGHT.	GREEN LIGHT.
	O, O, O, O, O.
	O, O, O, O, O, O.
	O.
O, O, O.	

Here the number expressed is 5603, and stands for

"Have you any News?"

(RED LIGHT.)

Fig. 2

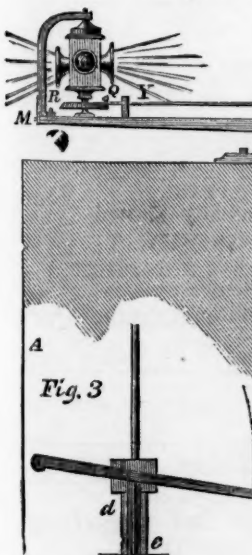

Fig. 3

(GREEN LIGHT)

Fig. 1

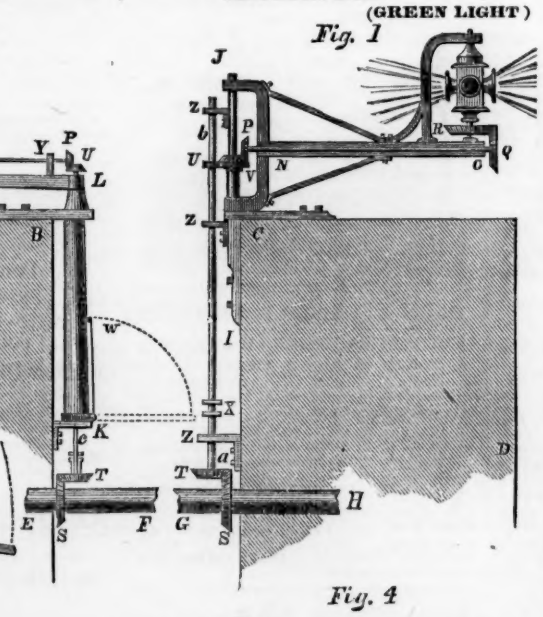

Fig. 4

MECHANICAL CONSTRUCTION.

In our engravings, Figs. 1 and 2, represent Vertical Sections through the wheel-house. In them E F and G H represent portions of the main Shaft. In Fig. 1, I J is a stout Iron or Wooden post, fastened against the side of the wheel-house, directly over the main shaft. On the upper part of this post, is fitted the moveable arm or crane N O, to the main shaft is fitted the bevel wheel S, and to the lower end of the rod a b, is fitted a corresponding wheel T. U is a small pinion on a b, which gears with the spur wheel, V, which in turns gives motion to the wheels, P and Q, and so revolves the lamp R. It will be seen that a Rotary motion is given to the lamp, when the main shaft is in motion and a b connected.

It can be disconnected by a lever, acting between the bosses X, which will elevate the rod in the guides Z Z Z.

Fig. 2 is another arrangement, for the same purpose. In this, K L, represent a hollow Shaft, on which is firmly fastened, the arm L M, on which is the lantern. The hollow post is secured to the wheel-house by the straps K and B, and it can turn freely in them, the other part being the same in them as in fig. 1

The lever K W, when drawn down, will turn the frame in any required position around the Shaft c U. In fig. 1, the arm or crane N O, may be operated by cords from the wheel-house, but in this device, the rod c U, does not lift up as in fig. 1, but in its place, the lower end is made square, and on it slides the short tube, d E, shown in fig. 3. The lower end of the rod turns on a bridge, f g, spanning the main shaft. On the upper end of the tube, d e, a lever is attached by means of boxes and collars as shown in fig. 4. This lever when raised carries with it the beveled wheel T, thus disconnecting the gearing apparatus.

ALBERT POTTS, Patentee,

PHILADELPHIA, Pa.

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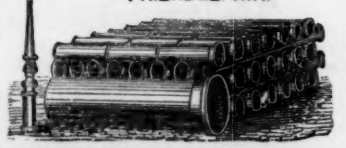

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